NEVADA GRAZING STATISTICS REPORT AND ECONOMIC ANALYSIS FOR FEDERAL LANDS IN NEVADA

Specifically:

Bureau of Land Management Lands, 1960 - 1999

Bureau of Reclamation, United States Forest Service, United States Fish and Wildlife Service, and the National Park Service Lands, 1980 - 1999

Total Federal Lands in Nevada, 1980 - 1999

March 26, 2001

Prepared for:

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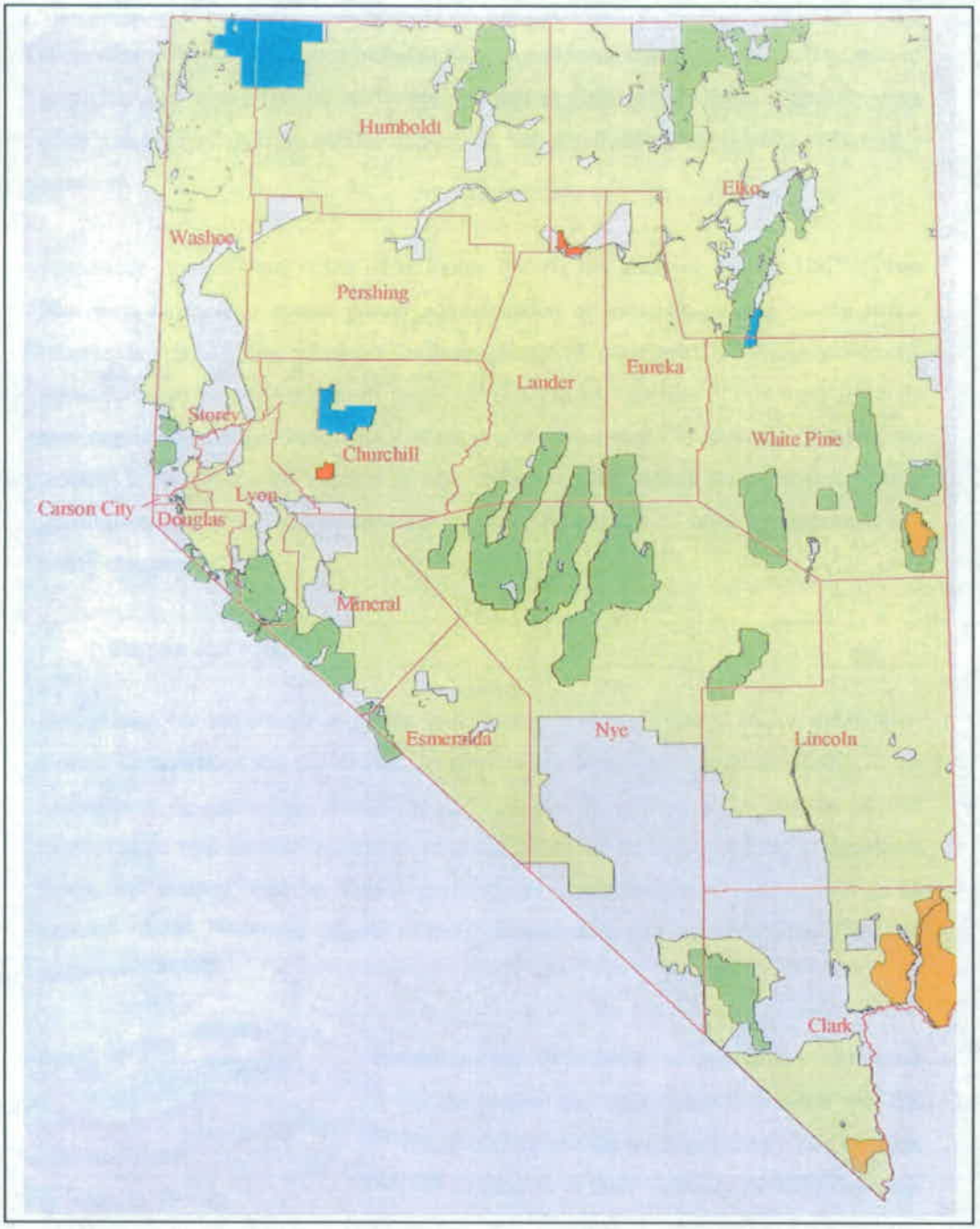
Humboldt
Elko
Washoe
Pershing
Lander
Eureka
Storey
Churchill
White Pine
Carson City
Lyon
Douglas
Mineral
Esmeralda
Nye
Lincoln
Clark

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ACKNOWLEDGEMENTS

The Nevada Association of Counties (NACO) and the Nevada Department of Agriculture greatly appreciate inputs to this report provided by the BLM, USFS, USFWS, BOR, and NPS. Without their prompt response to data requests and question clarifications this document would not have been completed in a timely manner. Their involvement with the project enhanced the quality of the final report. The BLM internal review of the draft version helped to clarify technical questions.

The economic analysis could not have been accomplished without the dedicated staff at the University of Nevada, Reno, University Center for Economic Development.

EXECUTIVE SUMMARY

This report contains the results of a one-year effort to gather data on historical and current grazing trends on Federal lands in Nevada. At the beginning of the project three reports had previously been produced by Resource Concepts, Inc, (RCI) that covered grazing history for about 1/3 of Nevada federal lands. During the process of producing the three reports, RCI collected BLM grazing data for the entire state. Therefore, a Nevada Grazing Statistics (NGS) database existed that contained nearly complete Bureau of Land Management (BLM) grazing records from adjudication through 1999 and some United States Forest Service grazing records. No other Federal land grazing data had been compiled for the state. This project was a cooperative venture between the Nevada Department of Agriculture and the Nevada Association of Counties (NACO). The project was contracted to RCI, who in cooperation with the University of Nevada, Reno, University Center for Economic Development, gathered and analyzed the statewide Federal Land grazing data.

Beginning in January 2000 grazing data were gathered for BLM, USFS, Bureau of Reclamation (BOR), United States Fish and Wildlife Service (USFWS), and National Park Service (NPS) lands. Data gathered included the following for each agency: permit or allotment name, permit or allotment number, permittee or lessee name, number of Animal-Unit-Months (AUMs, see page 10 for definition), and associated maps. Data were gathered for BLM allotments for 1960, 1980, 1995, and 1999. For all other Federal lands grazing data were gathered for 1980, 1995, and 1999.

Summarized results

The following economic and AUM grazing allocation changes occurred in Nevada from 1980-1999 (economic values assume that if each AUM lost were active then the values presented represent the losses depicted).

- Combined federal land AUMs lost in the state of Nevada from 1980 through 1999 were 473,553 (16%) with a corresponding negative $24,800,000 estimated impact to Nevada, and a negative $11,600,000 estimated impact to Nevada's livestock industry.

- Impacts to BLM lands included a loss of 374,045 (14%) permitted AUMs and an estimated negative $19,600,000 economic impact to Nevada with a $9,100,000 estimated loss to Nevada's livestock industry for the 19-year period evaluated in this study.

- USFS administered lands realized an estimated loss of 86,289 AUMs (23%) and an estimated economic loss of $4,500,000 to Nevada, with a $2,100,000 negative estimated impact to Nevada's livestock industry.

- A loss of 25,176 AUMs (78%) were realized on USFWS administered lands (Ruby, Stillwater, Sheldon-Hart, and Pahranagat National Wildlife Refuges) and from 1980-1999 with $1,300,000 estimated loss to Nevada's economy and $600,000 estimated losses to the Nevada livestock industry.

- BOR lands saw an increase of 10,218 AUMs and a resultant $500,000 estimated positive impact to Nevada's economy and $250,000 to Nevada's livestock industry.

- NPS lands lost 313 AUMs with a corresponding estimated loss to the Nevada livestock industry of $8,000 and a $16,000 loss to Nevada's economy as a whole.

With the exception of BOR lands, changes in AUMs throughout the state were generally a downward trend during the 1980 to 1999 period. These changes can be attributed to shifts in public attitudes, agencies administrative policy, climatic factors, livestock prices, resource conditions, competition with wildlife and feral horses, and a host of other factors.

The analysis provided in this report has shown that changes in the numbers of livestock grazing on Nevada public lands negatively impacted Nevada's economy, particularly the fragile economy of rural Nevada.

Summarized recommendations

Results of the Nevada Grazing Statistics report show that livestock grazing on Nevada's public land has been significantly reduced since 1980, and that these reductions have negatively impacted Nevada's economy. The question then becomes: What can be done to reduce this trend of livestock number reductions on public lands? Eliminating questionable, and sometimes unnecessary, livestock reductions (those reductions based on site specific monitoring, without addressing allotment wide livestock distribution problems) would help alleviate the rural economic losses related to livestock grazing, and maintain a viable livestock industry in Nevada.

Based on the results of this study and a comprehensive understanding of federal land grazing management in Nevada, the following list is a summary of major recommendations to maintain healthy resource conditions and an economically viable livestock industry in Nevada. Some agencies currently implement portions of the following list (for example, BLM has adopted the ecological site concept for all lands it administers). It is recommended that federal agencies in Nevada permitting livestock grazing implement all portions of the list:

- Use uniform long term monitoring methods for all agencies (i.e., standard monitoring methods for all agencies).
- Use scientific based monitoring methods appropriate to the resources of Nevada (as recommended by Nevada rangeland scientists).
- Develop cooperative and respectful interaction between livestock permittees and agency personnel when developing land management recommendations and decisions.
- Consider the economic impacts to permittees and local communities when making land management decisions.
- Set realistic resource objectives for allotments (i.e., do not use short term monitoring and utilization guidelines as objectives, as these are tools employed to achieve objectives).
- Adopt NRCS Ecological Sites for all public lands, and use them as a basis for management decisions.
- Livestock stocking rates should be amended based on long term monitoring supported by short term monitoring that includes allotment wide utilization mapping.
- Improve wild horse monitoring, management, and control methods as per the legal requirements to manage wild horses and burros within established Herd Management Areas.
- Balance the needs of wildlife and livestock through Allotment Management Plan (AMP) development.
- Use peer reviewed scientific information when making Threatened and Endangered species decisions that impact livestock grazing and rural economies.
- Commit funding and priority to AMP development and necessary range improvements to facilitate improved livestock distribution.
- Focus livestock management criteria on allotment-wide distribution as well as utilization of key areas.

- Use voluntary non-use as a mechanism for retaining AUMs while necessary range improvements and monitoring occur.

- Support the BLM's Great Basin Restoration Initiative and Eastern Nevada Landscape Restoration Project.

- Working cooperatively with the other representative agencies, et. al. Update the 1982 Nevada Rangeland Monitoring Handbook to more effectively reflect the present state of the science in Nevada.

Implementing the above goals will lead to improved resource condition and maintain a viable livestock industry on Nevada's public lands.

INTRODUCTION

Controversy has plagued public land grazing in the western United States for decades. Those supporting public land grazing are as adamant about the propriety of their views as are their opponents, who see grazing of federal lands as an adverse and often unnecessary use of western public land. The argument intensifies with each passing year. The debate itself is plagued with problems, especially the emotional intensity that surrounds those involved with the discussion. Individuals on both sides of the fence often cloud their views and opinions in a fog of emotion, rather than scientific or research-supported information.

The intent of this project and ensuing report is to add credence and reliable information to the discussion of public land grazing. Several important aspects of the public land debate, at least for Nevada, are presented in the following pages. These include: historically permitted numbers of livestock on Nevada Federal lands, mapping for agency boundaries of federal land grazing areas, and economic impacts to ranching and rural economies from federal grazing over the last 19 years.

Opponents of public land grazing often cite public land grazing as having little impact to the livestock industry as a whole, and that it has little impact to local economies. However, the importance of grazing management decisions, and the ensuing impacts to rural Nevada economies, should not be trivialized. This report contains definitive results illustrating the impact that federal land grazing decisions may have on rural economies. As outlined in this report, decisions to reduce or increase grazing on federal lands do have impacts to the rural and state economies.

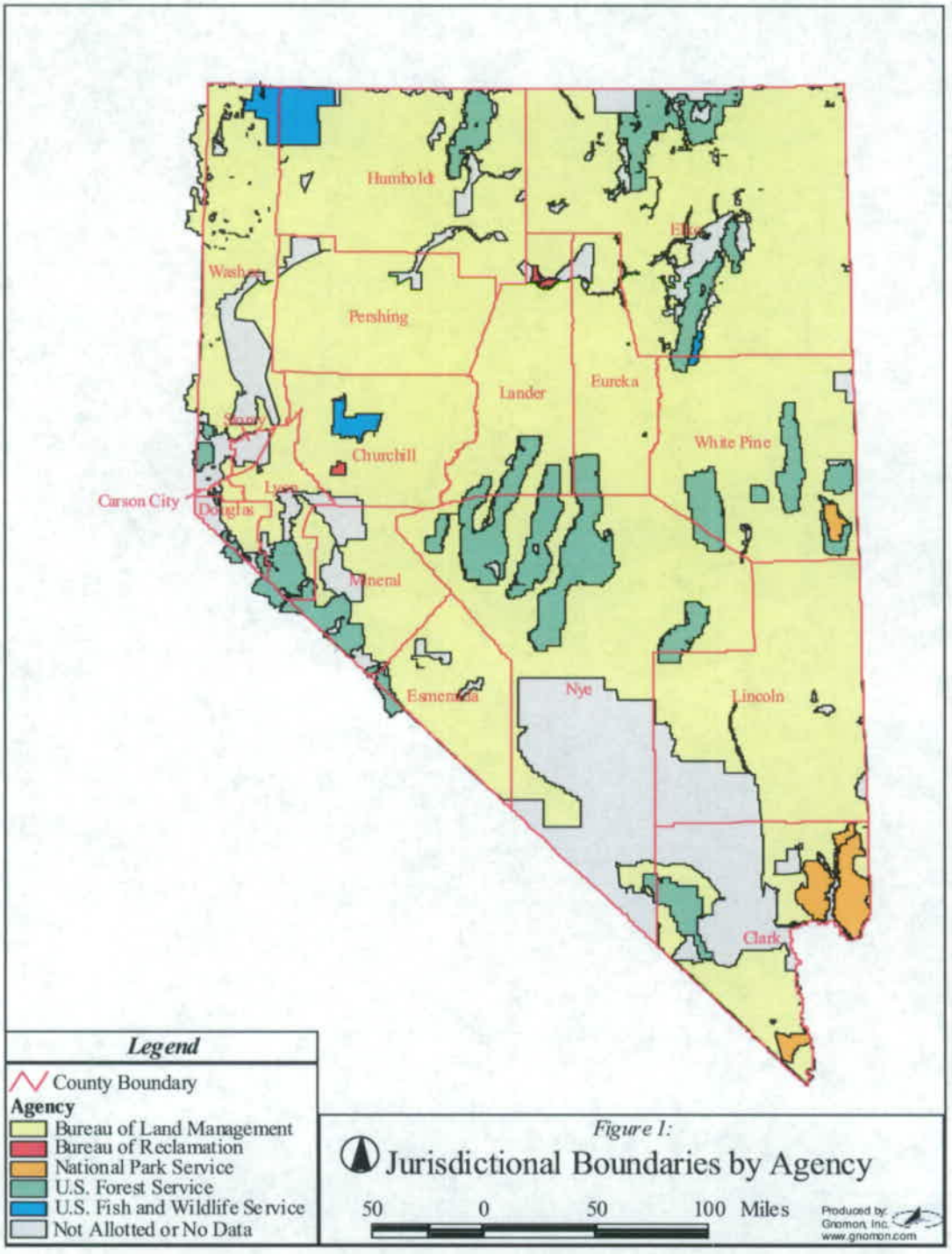
The following report was prepared at the request of the Nevada Department of Agriculture (NDA), in cooperation with the Nevada Association of Counties (NACO). Resource Concepts, Inc. (RCI), technical contractor to NACO, prepared the report with assistance in data and economic analysis by the University of Nevada, Reno, University Center for Economic Development.

There are several purposes of this report. First, is to document the legislative and administrative history of grazing management on federally administered lands within the state of Nevada. The lands reviewed include Bureau of Land Management (BLM), United States Forest Service (USFS), United States Fish and Wildlife Service (USFWS), Bureau of Reclamation (BOR), and National Park Service (NPS) administered lands (Figure 1). Second, the database compiled during this project documents changes in: numbers of animal-unit-months (AUMs) of livestock, number of permittees, and numbers of allotments within Nevada. The interrelationships concerning livestock grazing among these federal land agencies and private lands are complex. For simplicity, this report will present each agency's allotment data separately. Documentation of changes in livestock numbers is contained in the summary database (Appendix I – on compact disc) entitled the *"Nevada Grazing Statistics (NGS) Database."*

The report builds on the foundation of three earlier reports entitled, "Public Land Grazing in Eastern Nevada" (RCI 1998), "Public Land Grazing in Central Nevada" (RCI 1998), and "Public Land Grazing in Northwestern Nevada" (RCI 1997). Therefore, at the beginning of this project, fairly complete data existed in the NGS database for areas covered under the three reports.

Because of the availability of grazing records and diversity in management and permitting practices of the different agencies, the separating periods for each agency evaluated in this report are not identical. Evaluation of the USFS grazing permits begins in 1980 and carries through 1999, looking specifically at the years 1980, 1995 (when the previous reports were completed), and 1999. Evaluation of grazing within Great Basin National Park begins with its inception in 1986 and continues through 1999. Evaluation of BLM administered lands begins with adjudication, and carries through to 1999. All other federal lands reviewed in the report evaluated grazing for 1980, 1995, and 1999.

Figure 1.


Humboldt
Elko
Washoe
Pershing
Lander
Eureka
Storey
Churchill
White Pine
Carson City
Lyon
Douglas
Mineral
Esmeralda
Nye
Lincoln
Clark
Legend
County Boundary
Agency
Bureau of Land Management
Bureau of Reclamation
National Park Service
U.S. Forest Service
U.S. Fish and Wildlife Service
Not Allotted or No Data
Figure 1:
Jurisdictional Boundaries by Agency
50 0 50 100 Miles
Produced by:
Gnomon, Inc.
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This project was designed to gather data for the entire state of Nevada, including grazing allotments with boundaries that included Nevada and some out of state lands (i.e., part of a specific allotment might be in Nevada and part in California). These allotments were often managed by agencies outside of Nevada, but nonetheless have impacts to Nevada's economy.

Regulatory changes such as the BLM Range Reform '94 initiative and the USFS Forest Plan were enacted to ensure proper administration of livestock grazing on the public rangelands and to bring reform in the management of rangelands for the improvement, protection, and proper function of rangeland ecosystems. Results of this study illustrate how regulatory changes have impacted the regional economies in Nevada. The report's purpose is to provide information to help understand the present status of federal land grazing within Nevada and to illustrate the potential impacts of future management and policy changes.

Purpose and Funding

Recognizing the importance of public land grazing to the agricultural sector and to rural Nevada communities and economies, the Nevada Legislature appropriated $80,000 to the Department of Agriculture during the 1999 legislative session. The purpose of this appropriation was for the department to retain the necessary assistance to: 1) document public land grazing levels in Nevada over time to determine trends; and, 2) provide an estimate of the economic effects to rural communities and economies resulting in the documented trends.

Based on this direction and authorization, the Department of Agriculture developed specifications and a scope of work for the project and entered into a contract with NACO to complete the work program. This contract was approved by the Nevada Board of Examiners at their February 8, 2000, meeting. The project was initiated by NACO at that time.

METHODS

Definitions

During the course of this project it became apparent that definitions to describe similar concepts varied among BLM Field Offices and also among agencies. The following definitions are offered so the reader will better understand each term and their intent throughout this report.

- Permitted Use (Active Use, Permitted Preference, Active Preference): BLM and USFS term to denote the maximum allowable AUMs permitted to a permittee. The detailed definition BLM provided is as follows: "The maximum amount of livestock grazing allowed. Permitted Use is expressed in AUMs authorized under a term permit or lease for an individual permittee/lessee for an individual public land allotment. This level does not include 'adjudicated suspended non-use,' nor does it include authorizations issued as non-renewable, or authorizations authorized under an exchange of use agreement."
- Authorized Use: A BLM term to designate the number of AUMs paid for by a permittee.
- Actual Use: A BLM and USFS term to denote the number of AUMs grazing on the permit, i.e., the actual physical bodies of livestock on the land.
- Historical Suspended AUMs: A BLM term to describe the number of AUMs present, and above permitted AUMs at the pre adjudication period and cancelled through administrative decision.

Data Collection

Early in 2000, NACO submitted letters to Robert Abbey (Nevada State Director, BLM), Robert Vaught (Forest Supervisor, Humboldt-Toiyabe National Forest), Elizabeth Rieke (Area Manager, BOR), Robert Williams (State Supervisor, USFWS), Rebecca Mills (Superintendent, Great Basin National Park), and Alan O'Neill (Superintendent, Lake Mead National Recreation Area) describing the project, listing what information was being requested, and seeking cooperation in data collection and compiling the report (Appendix III).

Data Compiling Process

At the onset of the project the existing NGS database was nearly current for BLM allotment data. However, substantial data were still needed for all other land management agencies considered in this report.

The USFS issued a letter that their field staff would compile the requested data and forward the information to RCI. The USFS data were some of the first information received for the project. The USFS was provided with a list of data required to complete this study and a copy of the existing portion of the NGS database related to USFS lands. However, as stated above, the NGS database for the USFS allotments was not complete or current.

Gerald Grevstad, USFS Supervisory Range Conservationist, initiated the USFS data compilation process by gathering data at the Carson City Ranger District to determine the time required to complete the task, thus providing an estimate of staff requirements. He then requested that RCI provide assistance and then directed the schedule and data collection for the balance of the Nevada USFS lands. An RCI Range Technician accompanied Mr. Grevstad to each Nevada Ranger District office, sorting through permittee files and gathering the required data. Copies were made of all available permits and modifications for allotments covering 1980 through 1999. Changes in AUMs, among or between years, were recorded, and copies of documentation regarding the changes were obtained. The USFS database contains available history of permittees on the allotments through the 19-year span. This data does <u>not</u> include Temporary Non Renewable (TNR), temporary permits, private land permits, voluntary non-use, actual use, or other temporary adjustments. Mr. Grevstad's knowledge of Nevada USFS Permits greatly assisted in the collection of the data. He further provided conversion factors for USFS AUMs, and ensured data collection was thorough and accurate. Once the data were collected it was entered into the NGS database.

The Pershing County Water Conservation District and the Truckee Carson Irrigation District provided their data in completed from to NACO upon request. Both districts have BOR administered lands with grazing privileges.

In early June RCI sent letters to the Battle Mountain, Tonopah, Carson City, Elko, Winnemucca, Las Vegas, and Ely BLM Field Offices requesting verification and updating of the existing grazing database. Included with each letter were: a list of all the information required and a copy of the existing database records for each corresponding field office. At this same time a letter was sent to Robert Abbey, Nevada BLM State Director, requesting his assistance in obtaining grazing information for those allotments in Nevada, but managed by the Eagle Lake and Surprise Valley Field Offices located in California. In late July Nevada BLM State office personnel discussed the methodology and time line to complete the BLM data collection and verification with each Field Office. The requested deadline for data submission from BLM to RCI was set at August 31, 2000. Through the course of the data collection period allotments in Nevada, but managed by the St. George Field Office in Utah, Eagle Lake Field Office in California, and the Arizona Strip Office were identified and added to the database. Also, during the data collection phase of this project, staff encountered allotments administered by the White Mountain Ranger District in California, but with lands in Nevada. These allotments were added to the database.

Allotment maps for both BLM and USFS were provided by each respective agency in digitized form. Mapping for all other federal lands was provided in hard copy and digitized by the consultant. The mapping was put into a GIS database and linked to the NGS database.

Data Verification

The BLM requested that once the accumulated data were entered into the NGS database that a hardcopy be provided for verification. The verification with BLM was also required as part of the contract with NACO. Therefore, in late November each Field Office Manager received a summary report for allotments under their management. The USFS was also provided an updated summary report at the district and allotment level for verification. During November and December RCI received corrected BLM summary reports from most of the BLM Field Offices; Battle Mountain, Ely, and Las Vegas provided some written and some oral corrections to the database. Most Field Offices only had minor corrections. In mid December a meeting was held in Carson City and attended by Meg Jensen (BLM), Brad Hinds (BLM), Duane Wilson

(BLM), Tom Crawford (BLM), Don Henderson (Nevada Department of Agriculture), Robert Hadfield (NACO), John McLain (RCI), Robert Pearce (RCI), and Sandy Jonkey (RCI). The purpose of this meeting was to allow BLM the opportunity to clarify questions and to make recommendations to the report and for a final review of the BLM data.

The Nevada Grazing Statistics Database

Each allotment in the NGS database has a "field" (a field is a location in the Access database to enter data) for each category described below:

1) *Allotment Information:*

Allotment ID Number, Agency, Unit, Allotment Name, Allotment Notes, Allotment Record Creation Date, Author of Allotment Record Creation, Allotment Edit Date, and Author of Allotment Record Edit.

2) *Automatically Calculated Values:*

AUM Changes for Adjudication to 1980, 1980 to 1995, Adjudication to 1999, and 1980 to 1999.

Percent Changes in AUMs for Adjudication to 1980, 1980 to 1995, Adjudication to 1999, and 1980 to 1999.

Total AUMs for adjudication, 1980, 1995, and 1999.

3) *Sub Allotment Information (Individual Permittees)*

Permit Number, Permit Date, Adjudication Number, Permittee, Evaluation Status 1980 to1995 (and an accompanying note section), Evaluation Status 1995 to 1999 (and an accompanying note section), notes for 1996 to 1999, Grazing Reform Actions, Reasons for AUM changes, Record Creation Date, Author of Record Creation, Edit Date, and Author of Record Edit.

Not all allotments or permits will have entries for every "field" as data were not always available, or certain data is not relevant to particular agencies. However, as more information is obtained in the future it could be added to the database.

AUM Conversions

The USFS and BLM use different methods for reporting livestock numbers permitted on lands under each agencies management. BLM uses AUMs (animal-unit-months) and the USFS occasionally uses HM (head months), but also uses AUMs and AUs (animal units). Each USFS permit usually lists the number of animals, class of animals, and on/off dates. RCI staff calculated AUMs for each USFS allotment to insure consistency for what an AUM represents. Additionally, a USFS AUM does not equal a BLM AUM.

For USFS allotments AUMs have been calculated using the following formula:

Number of days livestock were on an allotment divided by 30; multiply the quotient by the number of head of livestock (sheep, cattle, or horses); multiply the product by the AU (animal unit) factor = AUMs.

USFS AU factors are:

- Mature cow = 1
- Cow/calf = 1.32
- Ewe w/lamb = 0.3
- Dry ewe = 0.2
- Horse = 1.2
- Bull = 1.5
- Yearling bovine = 0.7

This USFS AUM conversion formula was reviewed and approved by the USFS. If USFS AUMs were noted on a permit, that number was used in the database. It was found that when the AUMs were listed on USFS permits that there were different formulas used to calculate the AUMs from the HM depending upon which USFS District or Range Conservationist performed the conversion. Other complicating factors include: USFS staff sometimes use 30.41666 as the average month instead of 30 days; Occasionally they use 1 for a cow/calf pair instead of 1.32. Such inconsistencies in the USFS data made calculating equivalent AUMs difficult. However, attempts were made to assure AUMs reported in this document are equivalent within each agency.

To further illustrate the difficulty and to explain how differences in AUM definitions occur, the following official AUM definitions are offered:

An AUM equals the potential forage intake of one animal unit (AU) for one month (750 pounds dry matter or 25 pounds per day) (AU is 1000 pound non lactating cow or equivalent) (Valentine 1990).

An AU (animal unit) equals any specified combination of animals with a total forage demand of 12 kg of dry matter per day (26.5 pounds/day translates to 800 pounds/month = 1 AUM) (Heitschmidt and Stuth 1991).

AU = one mature (1000 pound) cow or the equivalent based upon average daily forage consumption of 26 pounds of dry matter per day (790/month = 1 AUM) (SRM 1974).

USFS AUM Definition Examples

The Humboldt EIS defines an AUM as a 1000-pound cow for a month (USDA 1985).

The Toiyabe EIS defines an AUM as a mature cow (1000 pounds) and a calf for a month (USDA 1985).

Within the USFS documents it is therefore possible to find different definitions of an AUM.

BLM AUM Definition Examples

The Jarbidge EIS defines an AUM as a 1000-pound cow for a month and/or 800 pounds forage per month (USDI 1985).

In the Rangeland Health Standards and Guidelines for California and Northwestern Nevada an AUM is defined as the amount of forage necessary to support 5 sheep or one cow and her calf for one month (USDI 1998).

The Nevada BLM Rangeland Web Site glossary defines an AUM as follows: The amount of forage needed to sustain one cow, five sheep, or five goats for a month. A full AUM fee is charged for each month of grazing by adult animals if the grazing animal: 1) is weaned, 2) is 6 months old or older when entering public land, or 3) will become 12 months old during the period of use. For fee purposes, an AUM is the amount of forage used by five weaned or adult sheep or goats or one cow, bull, steer, heifer, horse, or mule. The term AUM is commonly used in three ways: 1) stocking rate as in "X" acres per AUM, 2) forage allocation as in "X" AUMs in allotment A, and 3) utilization as in "X" AUMs consumed from Unit B (www.nv.blm.gov/range/Glossary.html).

As with the USFS documents, it is possible to find contrasting definitions of an AUM in BLM documents.

As shown above, definitions of AUMs within the USFS and BLM are different, and the definitions vary between the two agencies as well. The differences in AUMs are primarily in the amount of forage consumed per AUM (ranges from 750 to 800 lbs/day) and whether an AUM for bovines is a cow or a cow and her calf. The variations in AUM definitions combined with the USFS use of HM make it apparent how difficult it was to equilibrate AUMs among agencies, and within each agency.

Data Analysis

NGS Database

All grazing data for this report was input into a Microsoft Access Database (NGS database). Previous to initiating the project grazing data were input into an Excel Spreadsheet. The Excel data was transferred to the Access format to facilitate linking with an ArcView GIS database containing allotment mapping.

Data Entry and Analysis

All new data were provided in hardcopy form to RCI from the various agencies. Data were input into the NGS database (Microsoft Access format) and linked to a GIS Allotment map for Nevada.

The economic analysis portion of the project evaluated the period from 1980 through 1999. The 1980 starting year for economic analysis was selected because that was the first year that USFS complete data could be obtained. Therefore, in order to facilitate economic analysis for all Federal lands the 1980 year was used for the starting point for all economic analysis. The 1995 data are included in the report because that is the year the three previous NGS reports used as the final reporting year.

BACKGROUND

Grazing on federal lands has gone through many stages over the past two centuries, and changes continue to occur to this day. Early explorers and settlers homesteaded the most fertile and well irrigated lands. In the mid and late 1800's ranchers grazed on the federal lands with little intervention or regulation. However, as competition and conflict increased, and as environmental stewardship awareness increased, it became necessary to regulate federal land grazing. Prior to 1905, the Department of Interior's General Land Office (GLO) managed forest reserves (part of which became the USFS lands) and federal lands (those that are now BLM administered). In 1894, while still under GLO control, the "driving, feeding, grazing, pasturing, or herding of cattle, sheep, or other livestock" was prohibited within forest reserves (Rowley 1985). Although this regulation was changed the following year, the grazing of livestock, especially sheep, in forest reserves was allowed sporadically for the next decade. In 1905, the USFS was created under the Department of Agriculture. In effect, this removed forest reserves from the GLO and placed them under USFS control. Although there have been several attempts to merge the BLM and USFS, divergence in management philosophy and regulations affecting public lands continues to the present.

NGS History

This report presents updated and enhanced grazing information for Nevada Federal lands from data gathered in the mid and late 1990s. Three previous reports contained results for grazing history in specific portions of the state. The three reports are entitled, "Public Land Grazing in Eastern Nevada" (RCI 1998), "Public Land Grazing in Central Nevada" (RCI 1998), and "Public Land Grazing in Northwestern Nevada" (RCI 1997).

The "Public Land Grazing in Eastern Nevada" (RCI 1998) report was a compilation of a grazing analysis for the N-4 Nevada State Grazing Board area, which is primarily White Pine and Lincoln counties.

The "Public Land Grazing in Central Nevada" (RCI 1998) report contained a grazing analysis for the N-6 Nevada State Grazing Board area, which encompasses Eureka, Lander, and Nye counties.

The "Public Land Grazing in Northwestern Nevada" (RCI 1997) report was a summary document for the grazing analysis for the N-2 Nevada State Grazing Board area, which is primarily the Humboldt county region of the state.

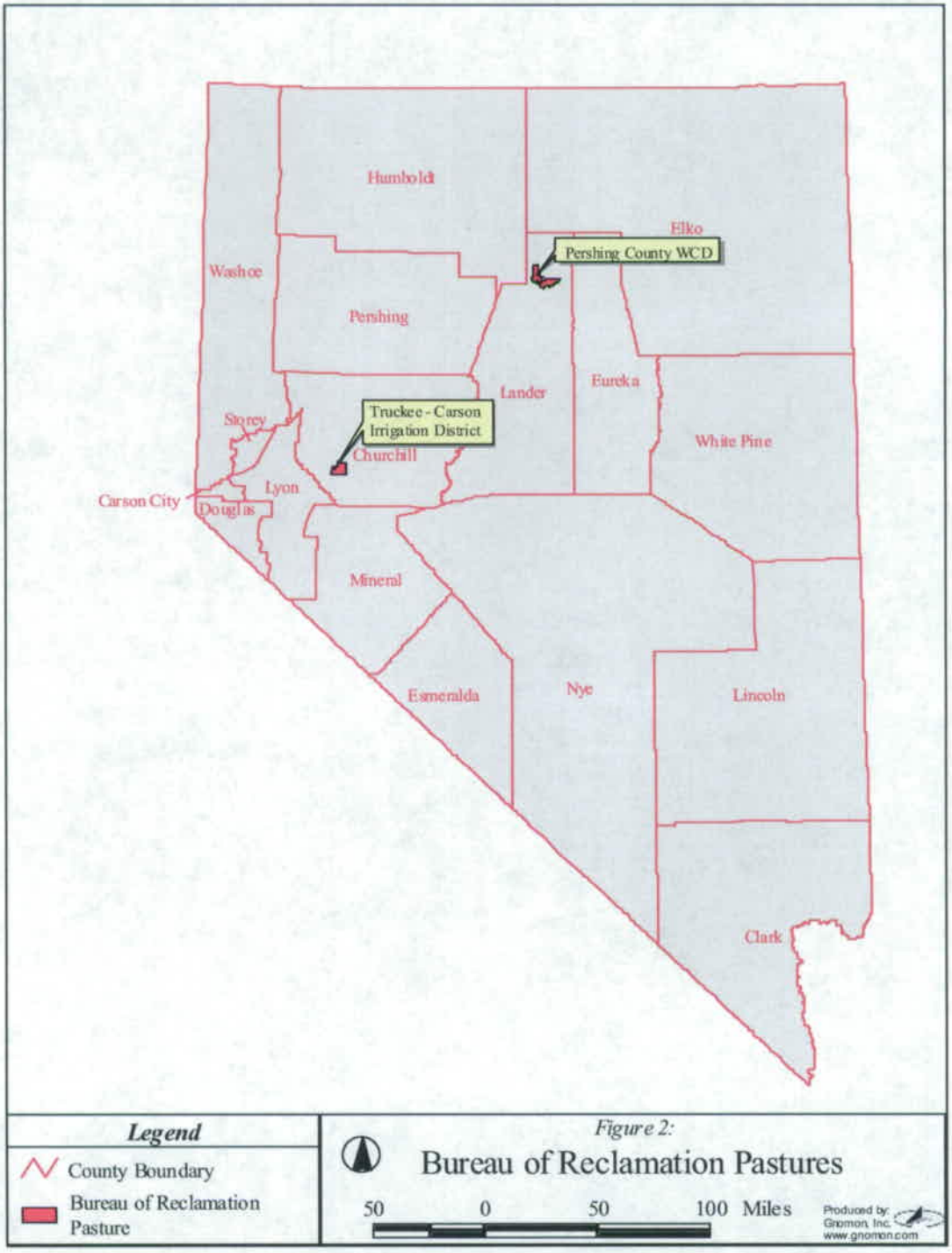
The three reports were summarized and published in Rangelands magazine (Pearce et al. 1999) under the title "Impacts of Federal Land Livestock Reductions on Nevada's Economy."

Bureau of Reclamation Grazing History

PERSHING COUNTY WATER CONSERVATION DISTRICT

The Bureau of Reclamation (BOR) land managed by the Pershing County Water Conservation District (Figure 2) has an interesting history. Early in the 1900's Lovelock Valley farmers and ranchers used their decreed water rights as a water source to build two reservoirs for irrigation water storage. They decided to build the reservoirs because the Humboldt River was too unreliable and unpredictable to be used as an irrigation water source. Later, farmers requested BOR provide further funding to construct a larger reservoir, but the BOR felt at that time the farmers did not have adequate water rights to justify construction of a larger reservoir. In response, the farmers acquired ranch lands with about 22,000 acre-feet of water rights near Battle Mountain. The farmers then returned to BOR with a new request for a larger reservoir, and at that time BOR agreed the farmers had enough water to construct present-day Rye Patch Reservoir. In the 1970's the Pershing County Water Conservation District repaid the loan to BOR for the Rye Patch Reservoir. Currently the Pershing County Water Conservation District manages the BOR Battle Mountain Community Pasture and leases the land for winter livestock grazing (personal communication, Bennie Hodges, PCWCD manager, 11/30/00). The Battle Mountain Community Pasture is located in northern Lander County, Nevada.

Figure 2.


Humboldt
Elko
Pershing County WCD
Washoe
Pershing
Lander
Eureka
Storey
Truckee - Carson
Irrigation District
White Pine
Churchill
Carson City
Lyon
Douglas
Mineral
Esmeralda
Nye
Lincoln
Clark
Legend
County Boundary
Bureau of Reclamation
Pasture
Figure 2:
Bureau of Reclamation Pastures
50 0 50 100 Miles
Produced by:
Gnomon, Inc.
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TRUCKEE CARSON IRRIGATION DISTRICT

No historical information in regard to the establishment of grazing was provided by Truckee Carson Irrigation District.

United States Fish and Wildlife Service Grazing History

RUBY LAKE NATIONAL WILDLIFE REFUGE

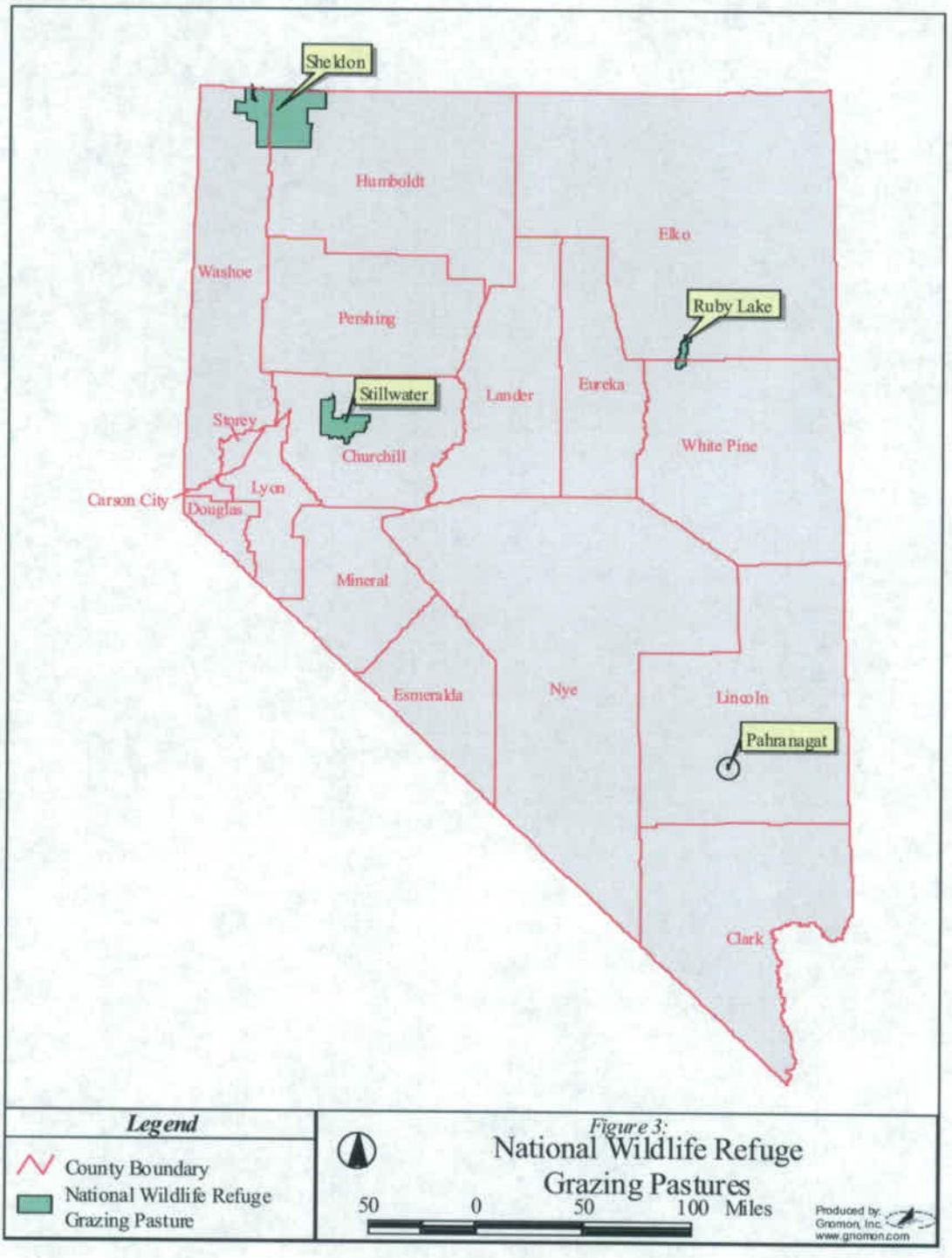
Ruby Lake National Wildlife Refuge became a refuge in 1938 (Figure 3). Existing grazing was continued with the original landowners as permittees. Prior to becoming a refuge the land was grazed in winter, spring, summer, and fall. Under the USFWS the refuge is managed as a winter grazing program (personal communication RLNWR staff, 11/29/00).

STILLWATER NATIONAL WILDLIFE REFUGE

The Stillwater National Wildlife Refuge (NWR) allows grazing through permits issued by the Project Leader for the Stillwater Wildlife Management Area (WMA) and the Stillwater NWR (Figure 3). The Stillwater WMA is comprised of Bureau of Reclamation withdrawn lands and livestock grazing is carried out pursuant to the 1948 Tripartite Agreement among Truckee Carson Irrigation District, the State Board of Fish and Game Commissioners (now the Nevada Division of Wildlife), and the U.S. Fish and Wildlife Service. The agreement expired in 1998, but livestock grazing provisions are being continued through the BOR. The Stillwater WMA is managed as a community pasture with all permittees running in common. Under the Tripartite Agreement the refuge staff managed grazing and muskrat harvest commensurate with wildlife conservation.

Recently, grazing on the Stillwater NWR was limited to one permittee in the South Marsh Area. However, the permit was not used in 1999, nor will it be used in 2000 (personal communication, Donna Withers, SNWR, 11/29/00).

Figure 3.


Sheldon
Humboldt
Elko
Washoe
Pershing
Ruby Lake
Stillwater
Lander
Eureka
Storey
Churchill
White Pine
Carson City
Lyon
Douglas
Mineral
Esmeralda
Nye
Lincoln
Pahranagat
Clark
Legend
County Boundary
National Wildlife Refuge
Grazing Pasture
Figure 3:
National Wildlife Refuge
Grazing Pastures
50 0 50 100 Miles
Produced by:
Gnomon, Inc.
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Sheldon-Hart Mountain Refuge

In 1936 the Sheldon-Hart Mountain Refuge was established (Figure 3). The USFWS shared management authority with the BLM. In 1976 the Game Range Act granted sole jurisdiction to the USFWS. Grazing permits were purchased in 1993-1994 from willing sellers by an outside conservation organization, which in turn donated the permits to the USFWS (personal communication SHMR staff, 11/29/00). At this time, no livestock grazing is permitted in the Sheldon-Hart Mountain Refuge.

Pahranagat Refuge

No historical information regarding the establishment of grazing on the Pahranagat Refuge was provided for this report.

United States Forest Service Grazing History

USFS lands in Nevada are distributed across the state (Figure 4). Grazing management practices began to change after the forest reserves were transferred into the Forest Service in 1905. These changes included the initiation of a grazing fee, the idea of commensurability, and the concept of range classification (Rowley 1985). Although some individuals opposed grazing fees at their inception in 1906, eventually a majority of permittees agreed that moderate grazing fees were necessary to properly manage the forests against trespass, overuse, and to allow for an increased use of the forests in the future (Steen 1977). Grazing permits were issued in a preferential order to those residents within the forest boundaries, residents near the forest boundaries, and finally, transient permittees, who held no interest in the nearby lands and were deemed to disregard the betterment of the forest reserves. Basing grazing permit issuance on commensurable property ensured permittees would have a place to locate their livestock during periods when the forest reserves could not be used (Rowley 1985).

Figure 4.

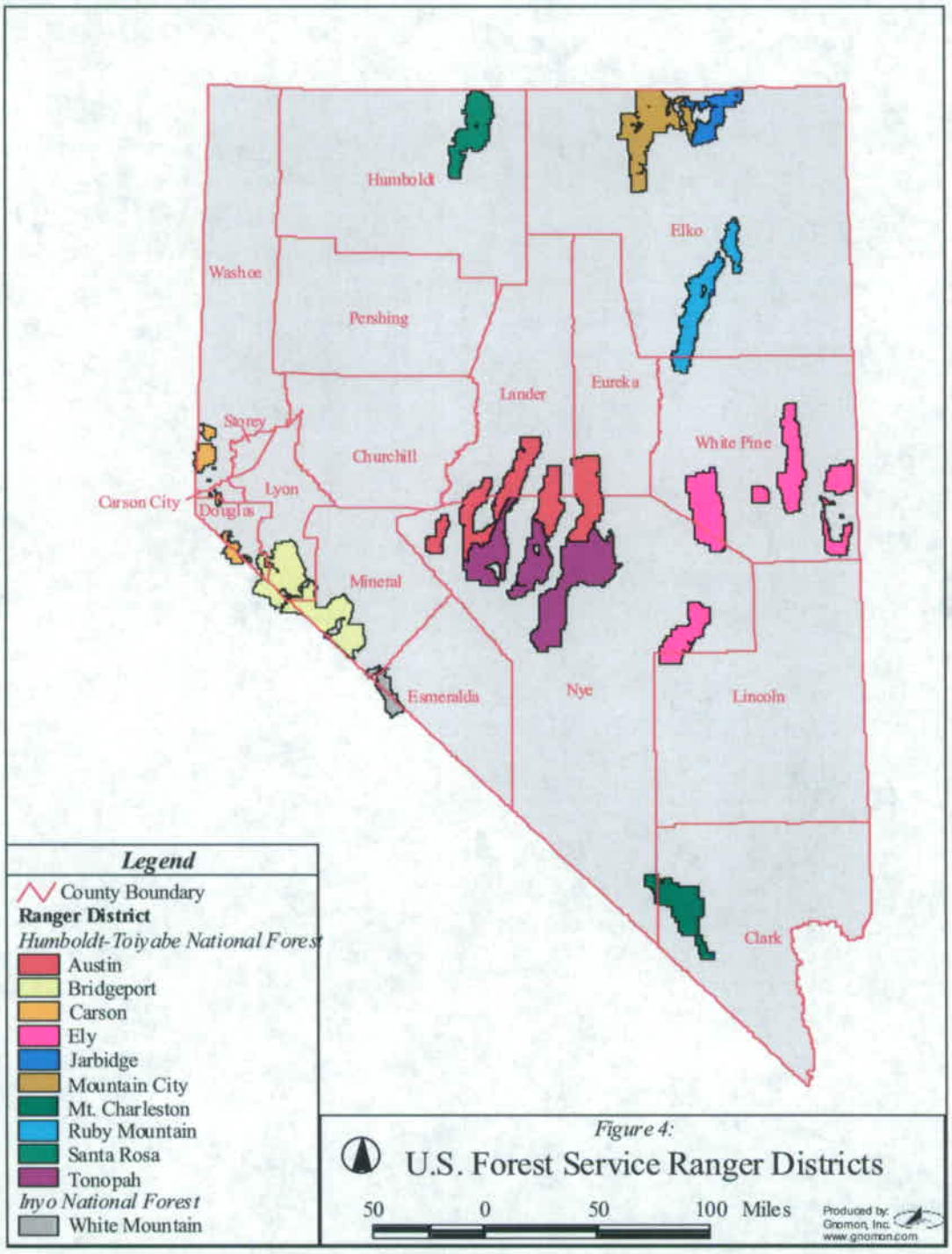


Figure 4:
U.S. Forest Service Ranger Districts

The creation of allotments was given a high priority under USFS administration. A management system that benefited the local economy and forest maintenance was established. First, the local ranger determined the historical level of use by each permittee. Then, after closely examining the availability and type of water and forage resources, the climate, and topography, the ranger developed allotments that benefited the small operator. Where a reduction in livestock numbers, or change in period of use, was necessary, the ranger did so in small increments. In many regions, upper limits of livestock permits were established to meet the carrying capacity of forests and meadows.

In 1917, the USFS proposed an increase in the grazing fee. This modest increase was proposed to meet the expanding demands on forest resources. USFS grazing permits have historically had high value to livestock producers. Livestock grazed on the reserves typically weighed more than those on nearby lower elevation lands. Management of livestock in the west historically had involved "following the green." As summer months approached and feed began to dry in the lower elevations, livestock operators would graze their animals toward the mountains, and into higher elevations (Burkhardt 1996). Additionally, during the early part of the 20th century the need to supply the war effort increased demand for USFS grazing within the livestock industry. As market prices increased in response to the war, profits offset the increased fees. For the first time, grazing fee increases were based on five or ten year permits. This allowed the permittee guaranteed use for a specified period, allowing the permittee to recoup expenses of range improvements and management practices. This practice of permitting on a ten-year basis continues today.

During the first two decades of forest management, there were very few reductions in livestock numbers. After the issuance of ten year permits in 1924, the USFS refused to reissue permits in 1934 citing the need to adjust stocking levels as a result of drought and continued overuse of forest resources. Despite appeals by the livestock industry, the USFS issued permits only through 1935 and proposed reductions in permits in the coming four years. Reductions of up to 30 percent of the livestock numbers could be made during the period from 1935 to 1940 (Rowley 1985). By doing so, the USFS established the use of livestock reductions as a means of forest management.

With increased demands of recreation, especially hunting, the USFS began to make greater provision for the wildlife. In the mid-1930's, the USFS coined the phrase "multiple use" when they had to justify an emphasis on one resource use at the expense of another (Rowley 1985). It was through these multiple use decisions that livestock numbers were reduced, allowing for increases in forage availability to wildlife. More recently, the USFS joined with the BLM in developing Coordinated Resource Management Plans on adjacent BLM and USFS lands. These plans allow large tracts of private, BLM, and USFS lands to be managed cooperatively for the benefit of all.

In 1960, Congress passed the Multiple Use-Sustained Yield Act, the intent of which was to foster conservation. The Multiple Use Act declared that the national forests "shall be administered for outdoor recreation, range, timber, watershed, wildlife, and fish purposes" (Rowley 1985). Unlike previous occasions when the USFS reduced permitted numbers to limit overstocking, the Multiple Use Act brought about a change in policy where managers looked to maintain and enhance the capacity of the forests through cooperative agreements and management practices. This was to be done before resorting to reductions in permitted grazing.

Historically, when discussing land management issues, the USFS dealt only with the livestock permittees. Passage of the 1969 National Environmental Protection Act (NEPA) and evolution of environmental and conservation oriented groups spawned an era in which the USFS was questioned for its perceived overstocked rangelands, concessions to the grazing industry, and other land use management decisions. Environmental groups have questioned the USFS on all aspects of land management, including recreational use, livestock grazing, and timber harvest, just to name a few areas.

After passage of the Federal Land Policy and Management Act (FLPMA) in 1976, the USFS began to integrate the concept of stewardship into its management decisions. With passage of the Public Rangelands Improvement Act (PRIA) of 1978, this "stewardship program" was expanded. Of many options permitted, this new act allowed for decreases in allotment grazing

fees if cooperative efforts were entered into between the USFS and permittee to improve the public lands.

With passage of the Forest Rangeland Resources Planning Act (RPA) of 1974 and the National Forest Management Act (NFMA) of 1976, the USFS was responsible for conducting an assessment or inventory of forests resources, and developing a program for the proper use of these resources (USFS 1986). These assessments developed into Forest Plans. Within Nevada, the Humboldt Forest Plan was developed and issued in 1986. The Toiyabe Forest Plan was developed in 1985. Primarily, these plans attempt to continue multiple use management of the forests and prescribe courses of action by which all the resources of the forests can be used to their fullest potential. The forest plans established grazing standards and guidelines, primarily based on grazing utilization. The majority of USFS allotments in Nevada are within the Humboldt-Toiyabe Forest.

Since the first regulation of grazing within national forests it has been difficult to enforce certain regulations and prosecute their violators. Initiation of the Uniform Action Guide in 1992 allowed for immediate enforcement of USFS regulations. District Rangers could impose a 25 percent livestock number suspension if violations of USFS grazing standards were observed. If these violations continued, these 25 percent suspensions could be changed to 25 percent cancellations, followed by further 25 percent suspensions. Prior to the issuance of the Uniform Action Guide, reductions of grazing numbers could only occur after evidence showed a repeated abuse of the lands. The Uniform Action Guide was intended to supply guidelines for grazing administration.

Since issuance of the Humboldt National Forest Plan in 1986, the Toiyabe and Humboldt Forests have been combined to form one administrative unit. In an effort to address the changes brought about by this administrative consolidation, and ever increasing pressures on the forest, the forest plan is scheduled to be revised over the next several years.

USFS Forest Enhancement Act

It is important here to discuss briefly the *National Forest and Public Lands Nevada Enhancement Act of 1988*. In summary, the Act provided a mechanism in Nevada to transfer certain BLM administered lands to the USFS, and some USFS administered lands to the BLM. About 662,000 acres of Nevada public lands were exchanged from BLM to USFS, and 23,000 acres of USFS land went to the BLM. The reason this is important to this project is that often when lands were transferred between agencies allotment boundaries were changed, AUMs changed, number of permittees changed, and allotments were combined. This created a situation where tracing allotment history became very difficult. Also, as has been mentioned, AUMs between BLM and USFS are different, so when an allotment went from one agency to another agency the meaning of the AUMs reported by the new agency would be different from the previous agency. As much as was possible records for the permits involved with the Act were dealt with to give an accurate picture of grazing, but it is possible that there were some discrepancies in the existing records that did not allow for a true interpretation of historic grazing for those allotments involved with the Act.

Bureau of Land Management Grazing History

The Bureau of Land Management (BLM) lands encompass a large portion of Nevada's territory (Figure 5). The General Land Office (GLO) managed grazing of public lands outside forest perimeters prior to 1934. Comprehensive management of these lands was initiated in 1934 when Congress passed the Taylor Grazing Act. The Grazing Service was established with the implementation of the Act. Specific tasks within the Act included: establishment of a permit system, organization of grazing districts, fee assessment, and consultation with local advisory boards. In 1946, the Grazing Service was combined with the General Land Office to create the BLM.

Figure 5

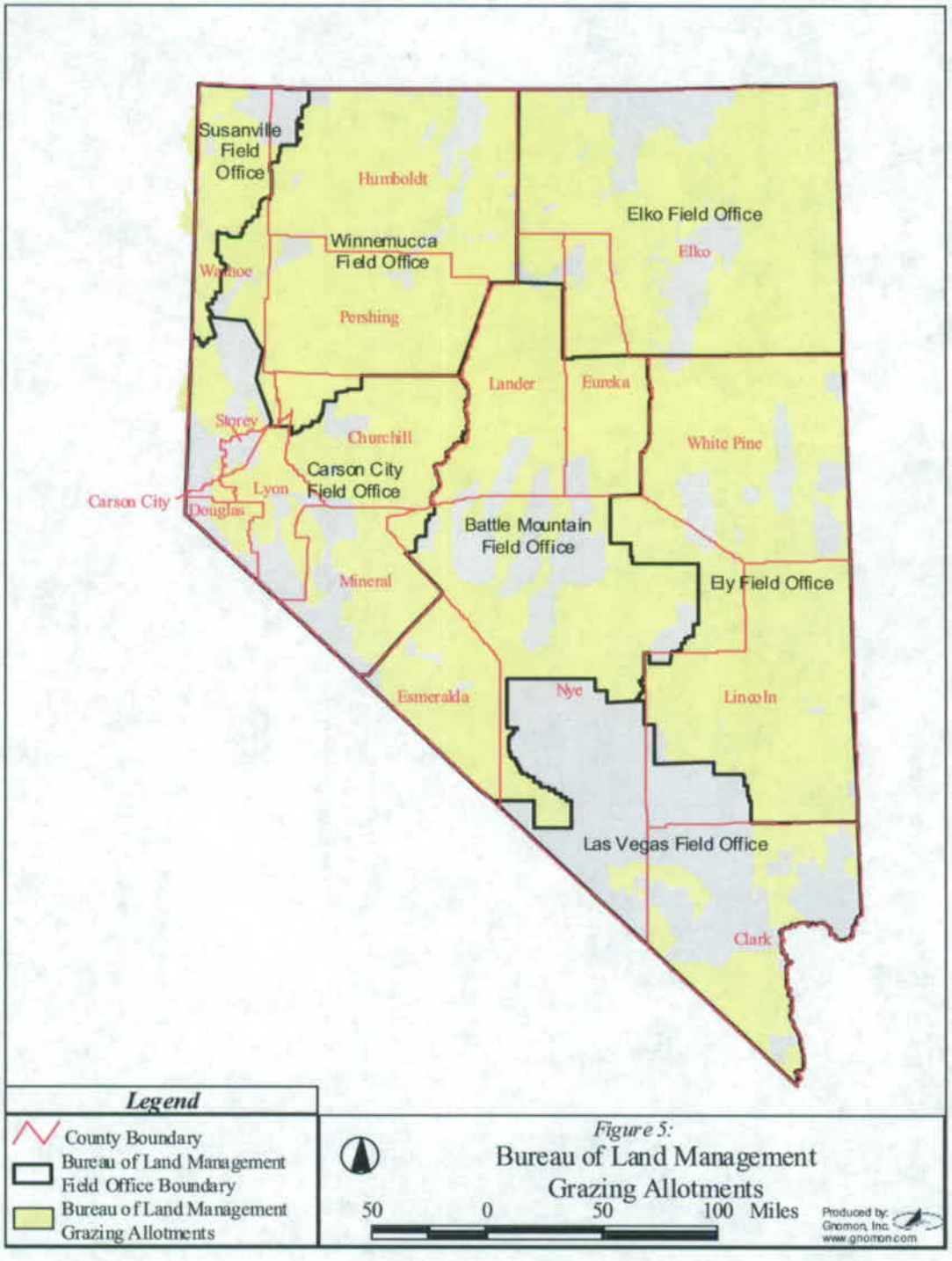


Figure 5:
Bureau of Land Management
Grazing Allotments

In the late 1960's and early 1970's, a shift in public attitude regarding the use of public land emerged. Congress passed the National Environmental Policy Act (NEPA) in 1969, directing land managers to consider the environmental consequences of activities on federal lands. As a result of the NEPA and the *Natural Resources Defense Council (NRDC) v. BLM* decision in 1973, Environmental Impact Statements (EISs) were prepared for every resource area administered by the BLM. One purpose of these EISs was to address the status of grazing and to develop an approach to meet long term goals of grazing on public land.

In 1976, Congress passed the Federal Land Policy Management Act (FLPMA). FLPMA requires that public domain lands be managed for multiple use. FLPMA also reaffirmed BLM's authority to reduce livestock numbers if necessary. Perhaps most important, FLPMA provided for the preparation of Allotment Management Plans (AMPs) in consultation, coordination, and cooperation with permittees for each grazing permit. This requirement integrated the development of AMPs into the permit process. The Public Rangeland Improvement Act (PRIA), passed by Congress in 1978, established a grazing fee formula that sets and adjusts annual fees for grazing on public domain land.

In 1986, a national management approach was initiated with the goal of monitoring the long term and short term effects of grazing. The objective of monitoring was to provide a long term database that would allow for the identification of specific problem areas, and the definition of management actions necessary to correct those problems. The method implemented was an "allotment evaluation" process with a 3 to 5 year data compilation interval. In 1984, a Nevada Range Studies Task Group developed and released the "Nevada Rangeland Monitoring Handbook" (SCS 1984) to serve as a technical guide in the monitoring process. This handbook is used in varying degrees by the agencies. "Sampling Vegetation Attributes" (USDI 1996a) and "Utilization Studies and Residual Measurements" (USDI 1996b) are two other monitoring references that are used by the agencies. These two documents were produced by the BLM, USFS, Natural Resource Conservation Service Grazingland Technology Institute, and the Cooperative Extension Service in a cooperative interagency approach with the goal of developing standardized monitoring across agencies.

In August of 1995, new regulations were enacted that changed methods and administrative procedures used by the BLM in its management of public lands. Commonly referred to as Rangeland Reform '94, these regulations directed the establishment of standards and guidelines to "achieve properly functioning ecosystems for both upland and riparian areas." In addition, these regulations changed how the BLM manages and permits grazing allotments. Grazing standards and guidelines for the Mojave-Southern Great Basin and Northeastern Great Basin regions were adopted and approved by the Secretary of the Interior on February 12, 1997.

The Post Adjudication Period (Mid-1960's to 1980)

The "adjudication" of BLM grazing permits occurred over a period of approximately fifteen years, from the mid 1950's through the late 1960's. Adjudication consisted of establishing the extent of historical grazing on allotments and included a review of the following factors:

1. Priority Use. Priority use meant establishing priority grazing use prior to the Taylor Grazing Act. All priority period use claims were subject to validation and constituted a primary permit preference limitation.
2. Base Property Production. All BLM Districts imposed a minimum base property requirement, predicated either on land or water. Such assets as privately owned base property, hay fields, hay stacks, pastures, and water rights were inventoried. Privately owned water flows were measured, and production was calculated. If the existing grazing allocation exceeded the maximum allowable base property production ratio, the grazing permit was subject to reduction.
3. Public Land Carrying Capacity. During the adjudication period, a one-point-in-time carrying capacity survey was conducted of all grazing allotments. After meeting the first two tests, if the existing grazing allocations exceeded the surveyed carrying capacity, the grazing permit was subject to reduction. Conversely, if the carrying capacity met the permitted numbers no AUM reductions were realized.

The collective results of applying these three limiting factors determined the amount of "adjudicated grazing privileges." Adjudicated permits were also referred to as "Base Property

Qualifications" that were subject to change and refinement as further site specific information became available. The adjudicated grazing permits also included a number for historical suspended AUMs. Historical suspended AUMs were those AUMs above the number of adjudicated AUMs that had historically been grazed on BLM lands.

There is no clear point in time when the "Adjudication Period" ended. For the purposes of this study, the period between 1965 and 1979 is defined as the "Post Adjudication Period." This period coincides with the completion of adjudication and the beginning of the "Evaluation Period" in 1980.

The post-adjudication period saw the formal implementation of "grazing management" by the BLM. Grazing management systems were developed and incorporated into allotment management plans (AMPs). As AMPs were implemented, a second round of grazing permit adjustments generally occurred. This management phase was well underway by the mid-1960's. It progressed until the mid-1970's when the NRDC lawsuit required a shift in management toward the development of environmental impact statements.

Most AUM reductions during this period were based on results of BLM Soil-Vegetation Inventory Method (SVIM) surveys, reported in the earliest grazing EISs. Protests from the range livestock industry and professional range management specialists caused the SVIM process to be reevaluated (RCI 1981), and it was demonstrated that one-point-in-time surveys could not be used to calculate rangeland carrying capacity in an accurate and consistent manner. The BLM issued a decision discontinuing SVIM surveys and began a program based on utilization and vegetation trend monitoring. Resultant monitoring data are used to evaluate whether or not grazing practices have been successful at meeting objectives established in resource management plans, rangeland program summaries, and AMPs.

The Evaluation Period (1980 to Present)

In 1986, the BLM Washington office issued Instructional Memorandum 706 (WO IM 86-706). This memorandum instructed that monitoring evaluations be conducted of all "I" and "M"

management category allotments[1]. Each allotment evaluation would result in either grazing agreements, issuance of grazing decisions, or documentation to the allotment file concerning grazing management. In 1989, the Nevada State BLM Office issued Instructional Memorandum 268 (IM NV-89-268). This memorandum focused on compliance with WO IM 86-706 and other existing laws and regulations pertinent to this change in policy. IM NV 89-268 (Revised) specifies how each district shall conduct the evaluation process. Since these directives were issued, there has been a new prioritization of goals. Currently, allotments containing wild horse herd management areas (HMAs) must undergo evaluation prior to allotments outside HMAs. This allows for the resolution of resource conflicts between wild horses and livestock, and to the establishment of appropriate management levels (AMLs) for wild horses.

Allotment evaluations were performed as monitoring results for a five-year period became available. These evaluations summarize vegetation condition and trend, and provide data so personnel may interpret how the current livestock use, wild horse use, precipitation, wildfire, and other factors influence vegetation changes. Each allotment evaluation concluded with specific management recommendations. Management changes were implemented in the years following evaluation, either through agreement or decision. Examples of management actions listed in the evaluations reviewed for this study are a reduction in livestock numbers, changes in grazing management such as implementation of a grazing system, or a change in season of use.

LAS VEGAS BLM FIELD OFFICE ALLOTMENTS

The Las Vegas Field Office (LVFO) allotment management differs from the remaining Nevada BLM offices in that most LVFO grazing permits are ephemeral (AUMs, season of use, and permittee may change year to year).

The Las Vegas Field Office provided the following information regarding ephemeral permits: Only two livestock grazing allotments managed by the LVFO (Crescent Peak, CA entirely in California, and Mount Stirling) have adjudicated AUMs. All other grazing allotments in the

[1] *BLM initiated a selective management process to prioritize expenditures of limited range management funds. Allotments were grouped into categories according to their resource potential, current management status, and complexity of resource issues. Allotments classified as "I" were to be managed to Improve current condition; allotments classified as "M" were to be managed to Maintain satisfactory conditions; allotments classified as "C" were to be managed Custodially while protecting existing resource values.*

LVFO are managed under ephemeral range management rules. There are no adjudicated AUMs associated with ephemeral range allotments.

In ephemeral range allotments forage production varies yearly. This variation is dependent upon rainfall, temperature, and wind conditions. Intermittently, substantial forage may be available for use by livestock. Favorable forage years are highly unpredictable and may have short seasons. Ephemeral forage may be available only one to three years out of every five. Since it is not possible to predict yearly forage production grazing is adjusted based upon a reasonable potential for forage production each year. Use of base property (water base) is not feasible or economical, and no use of base property is required except during those periods when ephemeral forage is available and livestock grazing occurs. An annual application to graze livestock is not required unless grazing is requested. Applications for time extensions and number changes may be considered as long as forage conditions remain favorable. Substantial use of grazing privileges is not required. A year-round grazing operation is not required. Livestock grazing may be authorized upon application, pursuant to any management requirements on the allotment.

On October 5, 1998 the Las Vegas RMP/EIS was officially signed. That document was prepared to ensure compliance with the provisions of the Endangered Species Act and subsequent Biological Opinions, as well as the Desert Tortoise Recovery Plan. The Las Vegas RMP consists of a combination of management directions, allocations, and guidelines that will direct where actions may occur, the resource conditions that must be maintained, and use limitations required to meet management objectives. The emphasis of the Las Vegas RMP is protecting unique habitats for threatened, endangered, and special status species, while providing area for other resource uses.

The current RMP/EIS calls for the closure of all allotments to livestock grazing within the planning unit, with the following exceptions: Hidden Valley, Mount Stirling, Lower Mormon Mesa, Roach Lake, White Basin, Muddy River, Wheeler Wash, Mesa Cliff, Arrow Canyon (minus the Battleship Wash), Flat Top Mesa, Jean Lake, and Arizona administered allotments. Furthermore, all land disposal areas were to be closed to grazing. Current land use plans designate allotments that currently have existing temporary closure be permanently closed. In

addition, all unalloted areas within southern Nye County were designated as permanently closed to grazing. Additional allotment closures could be approved based on voluntary relinquishment of grazing privileges, permits, or leases.

At the present time, all but Hidden Valley, Lower Mormon Mesa, Muddy River, Wheeler Was, Battleship Wash, Flat Top Mesa, Jean Lake, and the Arizona Administered Allotments have been closed to livestock grazing.

National Park Service Grazing History

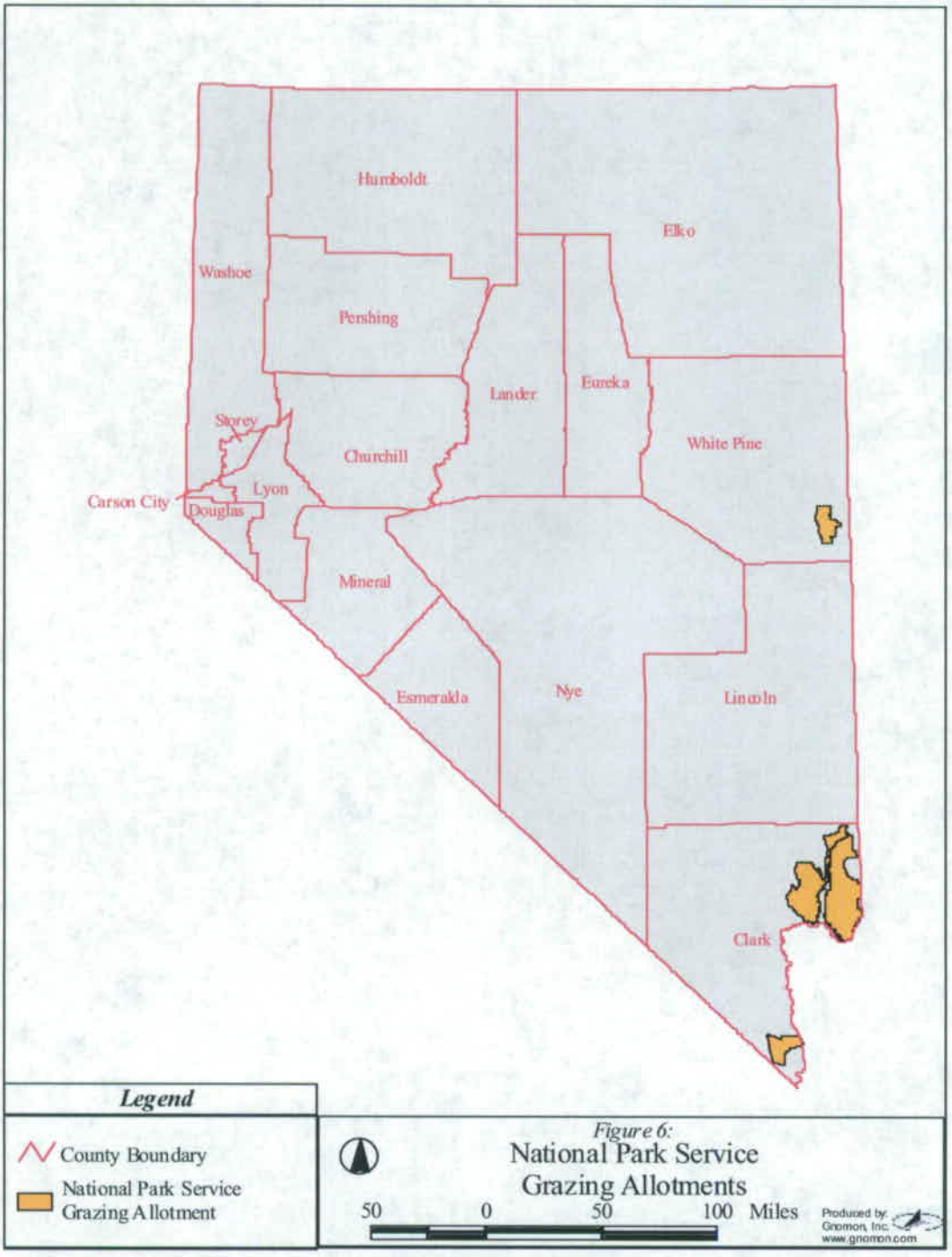
When Congress passed the Yellowstone National Park Act in 1872, public lands comprising what was to become Yellowstone National Park were to be preserved for public enjoyment and administered under the "exclusive control of the Secretary of the Interior." The park was reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart as a public park. The philosophy of Park Management in Yellowstone has served as an example for all parks created from that time until the present.

With the passage of the National Park Service Organic Act in 1916 the National Park Service (NPS) was created to promote and regulate the national parks and to "conserve the scenery and the natural and historic objects and the wild life therein" (NPS 1996). As management of these parks progressed, certain existing conditions such as grazing, hunting, and recreation were legislatively eliminated within the parks. These practices, which included grazing, were prohibited unless specifically authorized in the park's establishing legislation. Usually parks were established without grazing being permitted.

GREAT BASIN NATIONAL PARK

Lands comprising the Great Basin National Park (Figure 6) have previously been managed by the USFS. Grazing had occurred on the lands within the Park's boundary since the late 1860's. The USFS began issuing permits for these lands in the 1920's. On October 27, 1986, President Reagan signed the Act, which created the Great Basin National Park (GBNP). This 49th National Park included parts of the Lehman Caves National Monument and Humboldt National Forest.

Figure 6.


Humboldt
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White Pine
Carson City
Lyon
Douglas
Mineral
Esmeralda
Nye
Lincoln
Clark
Legend
County Boundary
National Park Service Grazing Allotment
Figure 6:
National Park Service
Grazing Allotments
50 0 50 100 Miles
Produced by:
Gnomon, Inc.
www.gnomon.com

Unlike many other national parks, the Great Basin National Park permitted the grazing of livestock "within the park to the same extent as was permitted" on July 1, 1985. Grazing was to be administered by the Park Service in a manner compatible with grazing regulations of the Forest Service. Policies created by the Park Service could be revised to ensure compatibility with Forest Service regulations.

Prior to approval of environmental assessments for the Grazing Allotment Management Plans in 1996, grazing within the park was regulated under an interim agreement between the National Park Service, USFS, and BLM. Further guidance was developed in the Great Basin National Park Plan.

While this report contains grazing information through 1999, it is noteworthy that in 2000 all grazing in the GBNP was suspended and permittees grazing privileges were purchased by a conservation organization and retired by the NPS.

Lake Mead National Recreation Area

Lake Mead National Recreation Area (LMNRA) was the first National Recreation Area (NRA) in the United States and was established on October 8, 1964 (Figure 6). Livestock management has occurred with a cooperative agreement between LMNRA and BLM through 1998.

RESULTS

Livestock - AUMs

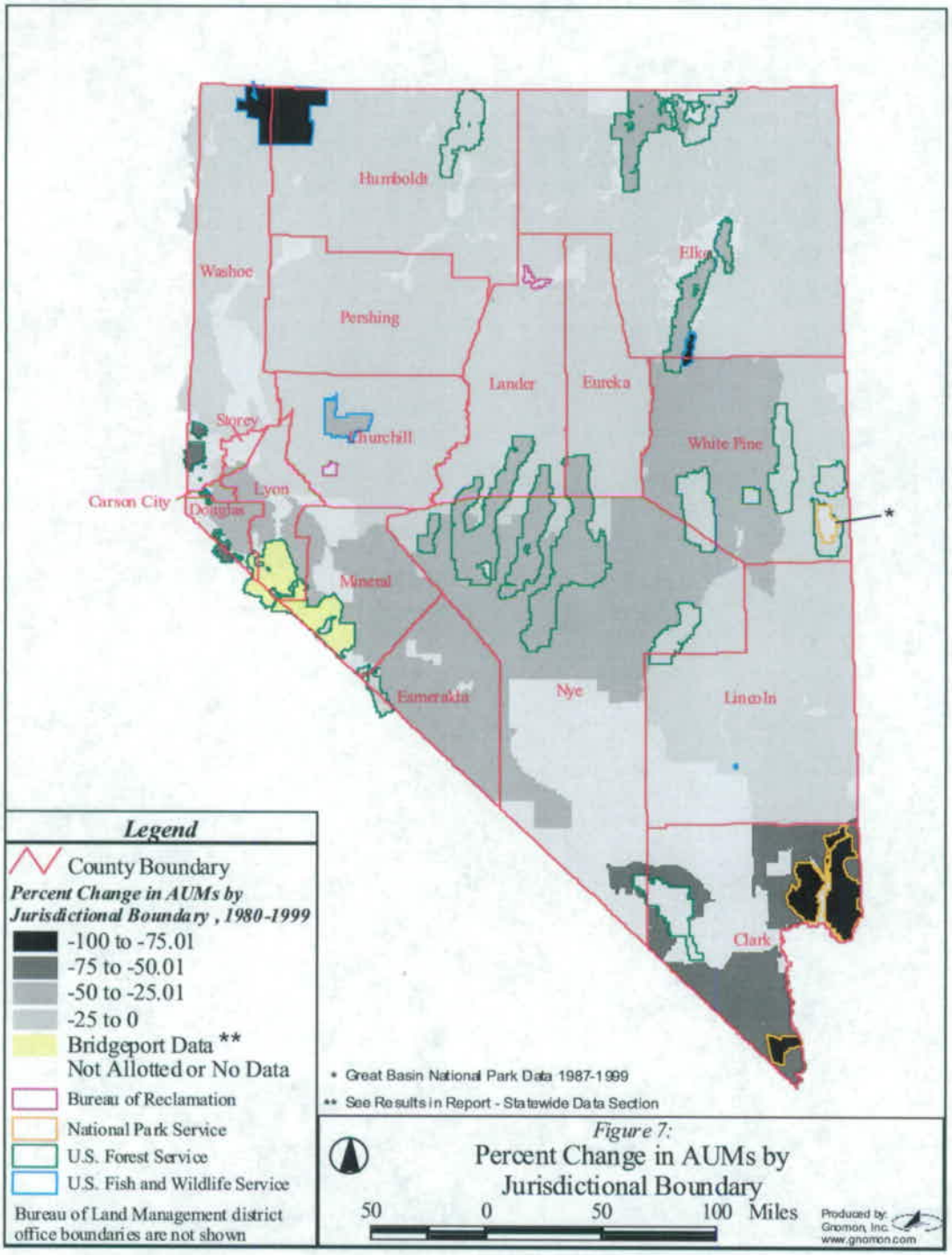
STATEWIDE DATA

The combined data gathered for USFWS, BOR, USFS, and NPS shows that in 1980 there were 3,020,399 AUMs on Nevada Federal Lands, and in 1999 there were 2,546,846 AUMs. Therefore, there was a loss of 473,533 AUMs, a 16 percent change, for the 19-year period. Figure 7 illustrates the 1980-1999 AUM changes in Nevada as a percentage based on administrative unit (Ranger Districts, BLM Field Office, BOR Lands, USFWS Lands, and NPS Lands).

A review of the NGS database and Figure 7 will show that the Bridgeport Ranger District had an increase in AUMs. This is misleading, as the increase is a result of the lands obtained through the Forest Service Enhancement Act described previously. Though the data and Figure 7 show an increase for the Bridgeport Ranger District there was actually net loss for AUMs on those lands exchanged between the BLM and USFS as a result of the Forest Service Enhancement Act. Thirty-eight BLM and USFS allotments were involved with the land exchanges as a result of the Forest Service Enhancement Act. For those lands influenced by the Forest Service Enhancement Act there were 36,694 AUMs in 1980, and 31,524 in 1999, for a loss of 5,170 AUMs (14 percent).

The following sections contain data for each agency. More specific data by administration unit (Ranger District, the old BLM Resource Areas, and individual USFWS refuges) are contained in Appendix IV.

Figure 7.

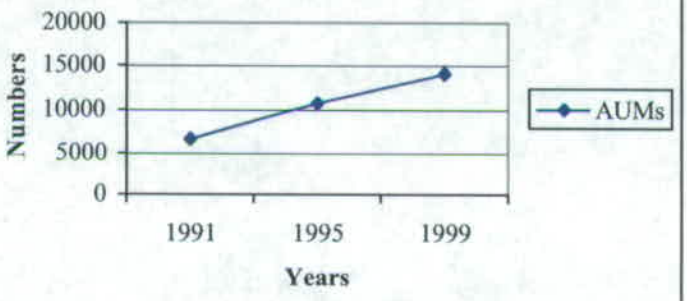

Humboldt
Washoe
Pershing
Lander
Eureka
Elko
Storey
Churchill
White Pine
Carson City
Lyon
Douglas
Mineral
Esmeralda
Nye
Lincoln
Clark
*
Legend
County Boundary
Percent Change in AUMs by Jurisdictional Boundary , 1980-1999
-100 to -75.01
-75 to -50.01
-50 to -25.01
-25 to 0
Bridgeport Data **
Not Allotted or No Data
Bureau of Reclamation
National Park Service
U.S. Forest Service
U.S. Fish and Wildlife Service
Bureau of Land Management district office boundaries are not shown
* Great Basin National Park Data 1987-1999
** See Results in Report - Statewide Data Section
Figure 7:
Percent Change in AUMs by Jurisdictional Boundary
50 0 50 100 Miles
Produced by: Gnomon, Inc. www.gnomon.com

Bureau of Reclamation Lands Data

Battle Mountain Community Pasture

The Pershing County Water Conservation District manages the Battle Mountain Community Pasture. No records were available prior to 1991. In 1991 6,429 AUMs were grazed during June through October. From May through November of 1995 10,517 AUMs were grazed. During May through November of 1999 14,031 AUMs were utilized. Therefore, there was a 118% increase in AUMs from 1991 to 1999 and a 33% increase from 1995 to 1999 (Figure 8.)

Figure 8. Pershing County Water Conservation District Grazing History



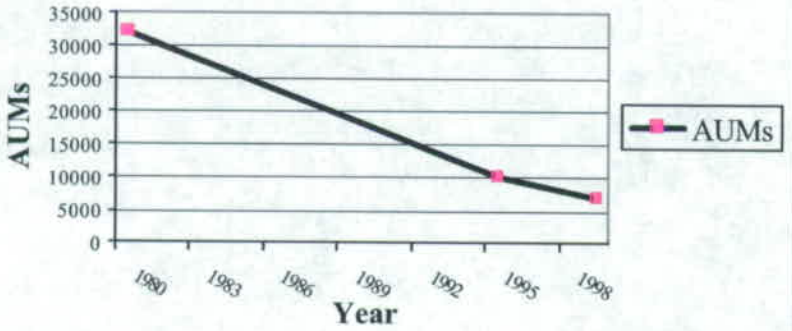
Truckee Carson Irrigation District

The Truckee-Carson Irrigation District (TCID) has management responsibilities for the Carson Lake Pasture, Inside Sheckler, Harmon Area, and Old River area grazing leases. Information from the District was at best fragmented. This report contains a summary of the entire grazing record on file at the District, but it is obviously lacking in detail. Available data showed a decrease from 6,295 AUMs in 1982 to 2,482 AUMs in 1999 (Figure 9).

United States Fish and Wildlife Service Data

The Stillwater National Wildlife Refuge (NWR), Ruby Lake National Wildlife Refuge, Sheldon Refuge, and the Pahranagat Refuge data were combined and illustrated in Figure 10. Grazing on Nevada's Wildlife refuges was reduced by 25,176 AUMs during 1980-1999, a 78 percent reduction.

Figure 10. AUM Changes on USFWS Managed Lands 1980-1999



A detailed description for each of Nevada's Wildlife Refuges is presented in the next four sections.

Stillwater National Wildlife Refuge

The Stillwater National Wildlife Refuge (NWR) allows grazing through permits issued by the Project Leader for the Stillwater Wildlife Management Area (WMA) and the Stillwater NWR. The Stillwater WMA is managed as a community pasture with all permittees running in common. Recently grazing on the Stillwater NWR was limited to one permittee in the South Marsh Area. However the permit was not used in 1999, nor will it be used in 2000. Permits on the Stillwater NWR are non-transferable and as permittees have left the refuge, or passed away, the permits were retired and grazing ceases for that permit.

In 1980 there were 12 permittees with 16,548 AUMs authorized and 12,098 AUMs of actual use. In 1995 there were 5887 AUMs of authorized use, a 51% reduction from 1980. In 1999 eight of nine permittees had actual use of 6,178 AUMs of 11,036 authorized. There was therefore a 49% reduction in AUMs from 1980 to 1999.

Ruby Lake National Wildlife Refuge

Four permittees grazed 5,083 AUMs on the Ruby Lake National Wildlife Refuge in 1980, lowering to 1 permittee and 713 AUMs in 1999. The result was an 86% AUM reduction from 1980 to 1999. Recently, Ruby Lake National Wildlife Refuge personnel conducted studies determine grazing impacts to the refuge. As a result of the studies season of use was changed from spring to summer or fall. Administrative policy now states that as permittees give up permits for whatever reason, the permits will not be issued to a new permittee.

Sheldon-Hart Mountain Refuges

During 1980 seven permittees grazed 14,471 AUMs on the Sheldon Refuge. In 1994 all grazing permits were purchased from the permittees and retired. Therefore, at this point no livestock grazing occurs on the Sheldon Refuge. There has been a 100% reduction on the Sheldon Refuge

for the 1980 to 1999 period. The decision to purchase the permits was based on pressure from environmental groups, and an internal scientific study group.

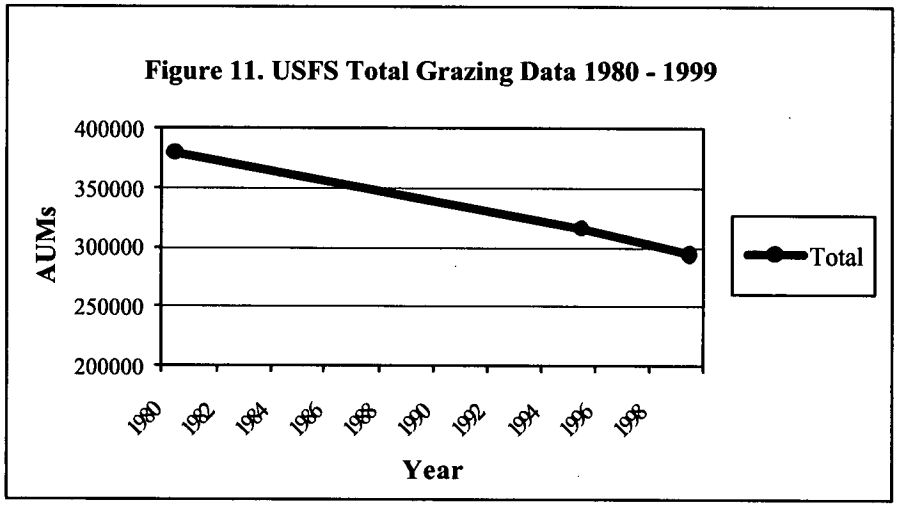
Pahranagat National Wildlife Refuge

During 1980 415 AUMs were utilized on the refuge, increasing to 1857 AUMs in 1995, and by 1999 grazing was temporarily eliminated. During the period of 1980 to 1995 there was a 344% increase in grazing, and from 1980 to 1999 there was a 100% decrease in grazing. Within the refuge historic use of grazing was used as a tool for vegetation management. Pahranagat NWR staff determined the grazing was not achieving their vegetation management goals, and therefore, ceased grazing on the refuge. Administration is currently revising Refuge management goals and objectives, including an analysis of the feasibility of utilizing grazing as a wildlife management tool at the Refuge. A draft Refuge Habitat Management Plan is expected in 2001; grazing may or may not be brought back to the refuge.

UNITED STATES FOREST SERVICE DATA

USFS permitted grazing data illustrate that 379,831 AUMs existed in 1980, 315,719 in 1995, and 293,542 in 1999 (Figure 11). The resultant loss was 86,289 AUMs or a 23% reduction during the 19-year period of analysis.

Figure 11. USFS Total Grazing Data 1980 - 1999



BUREAU OF LAND MANAGEMENT DATA

BLM Permitted grazing data illustrate 2,696,275 AUMs at adjudication (plus 419,755 historical suspended AUMs), 2,602,206 AUMs in 1980, 2,293,702 in 1995, and 2,228,161 in 1999 (Figures 12 & 13). Therefore, 374,045 AUMs were lost from 1980 to 1999, a 14 percent reduction.

Figure 12. BLM AUM Changes by Field Office 1980 - 1999

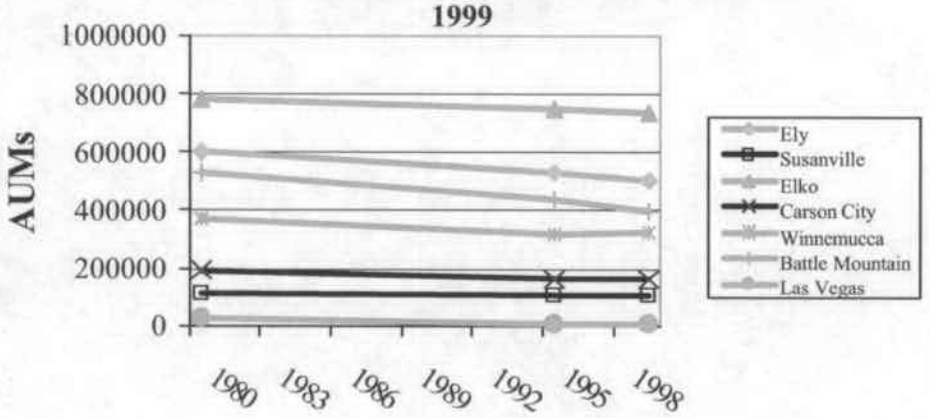
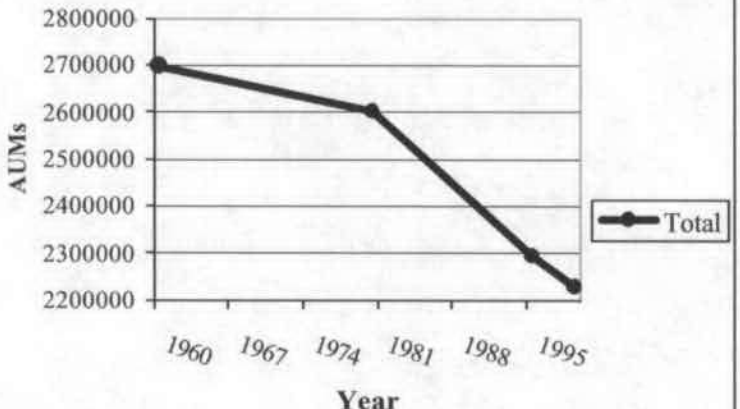


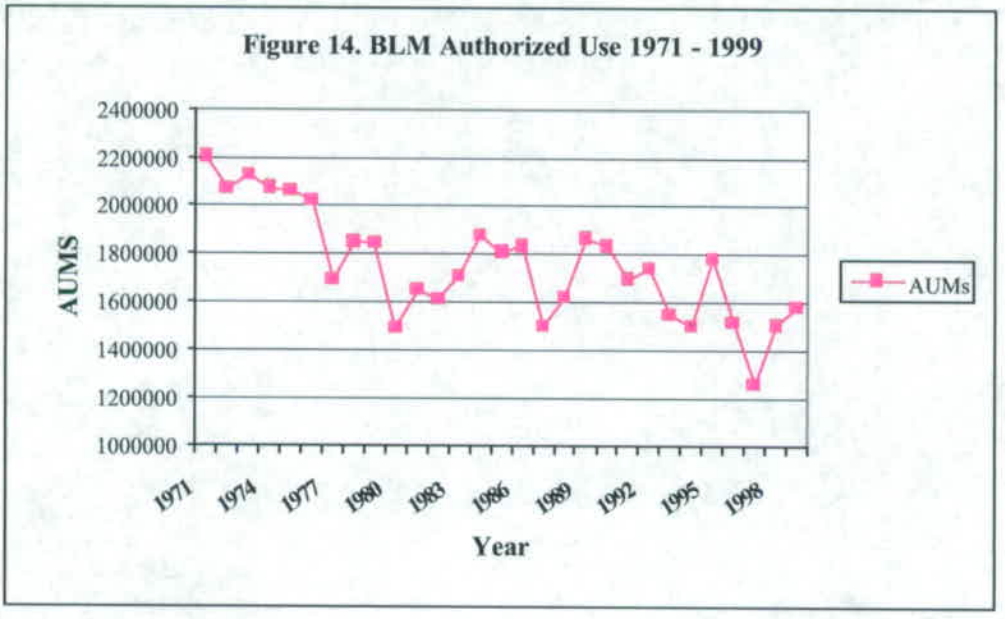
Figure 13. BLM Grazing History 1980 -1999 Total AUMs



BLM Authorized Use Data

Two methods of reporting AUMs for BLM lands are presented in this document. The previous section summary contained the Permitted numbers, i.e., the maximum allowable AUMs allowed on BLM lands. This section presents Authorized AUMs, those AUMs actually paid for by permittees. Authorized AUMs more closely relate to the actual number of animals on the land. The Authorized AUM numbers were provided by the BLM and were obtained from their Grazing Authorization and Billing System (GABS) database. In observing the data it is apparent there are significant yearly fluctuations in the number of AUMs authorized. These fluctuations will be discussed in the next section, but might be related to livestock prices, precipitation, competition with wild horse numbers, wildlife numbers, and changes in administrative policies. Interpretation of Figure 14 shows a rapid downward trend from 1971 to about 1980, and then there is a reduced downward trend in Authorized AUMs from 1980 to 1999. The 1971 starting year was the first year data were available for BLM Authorized use. From 1980 through 1999, the economic analysis period for this report, there was a gain of 87,296 authorized AUMs. However, if one were to choose 1979 or 1981 as the starting year then there was a decline in Authorized AUMs through the 1999 period. It just so happens that 1980 had a low number of AUMs, thereby skewing the trend result.

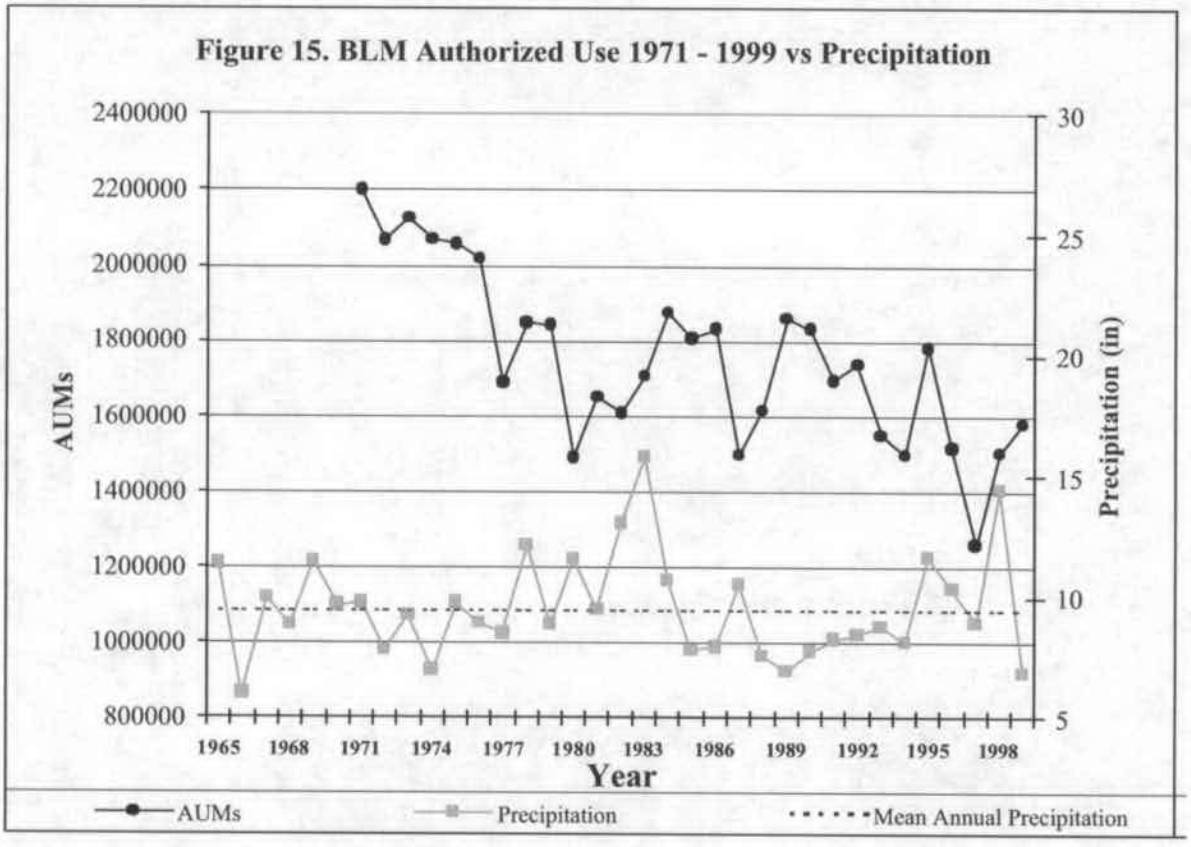
Figure 14. BLM Authorized Use 1971 - 1999



Interpretation of Authorized Use Data

As mentioned in the previous section authorized use represents the actual AUMs that were paid for by permittees. It primarily reflects voluntary reductions by permittees for a given year. Therefore, in order to determine why there were wide yearly fluctuations in Authorized AUMs, annual precipitation was plotted against the authorized use (Figure 15). For the period of 1965 through about 1976 there was not much correlation between the two variables. However, from 1976 to 1999 variations in precipitation are closely related to fluctuation in authorized AUMs. For example, starting in 1981 precipitation increased for several years, correspondingly, AUMs increased for the same period; the period 1988-1994 had years of below mean precipitation and also had a period of corresponding decrease in AUMs. Figure 15 is extremely important, for it offers a potential explanation of yearly variations in Authorized AUMs on BLM lands based on precipitation. Almost every rise or fall in AUMs corresponds with a rise or fall in precipitation.

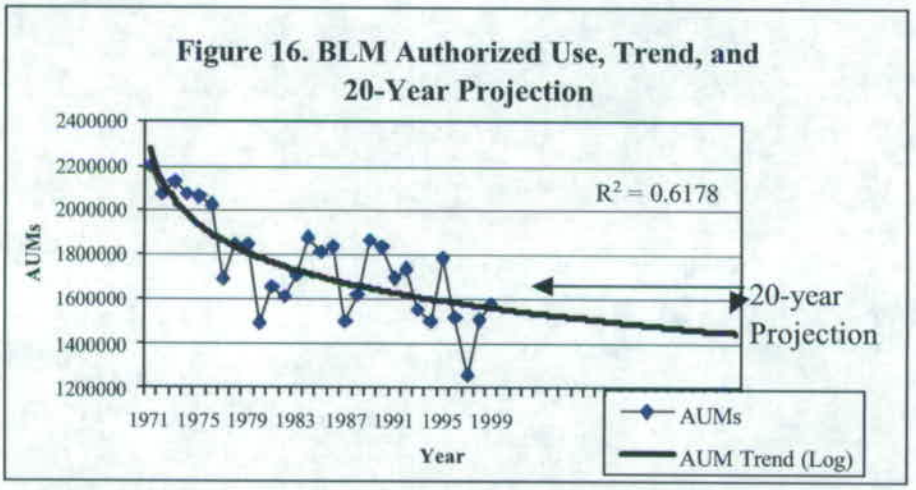
Figure 15. BLM Authorized Use 1971 - 1999 vs Precipitation



It is also interesting that when fall livestock prices are compared to Authorized AUMs in correlation analysis, there is a moderate (in the negative 0.60 range) correlation. It is difficult to determine if prices drive the numbers, or if prices are a response to livestock number fluctuations. However, the two variables, precipitation and fall livestock prices, may account for a major part of the yearly fluctuations in Authorized AUMs.

Prediction of AUMs Based on Authorized Use

Figure 16 represents a projection 20 years post 1999 for Authorized AUMs based on the nearly 30 year record. It appears that the Authorized AUMs had a period of rapid decline from 1971



through about 1980, and then the trend begins to be leveling off. Therefore, a logarithmic best-fit trend line was applied to the data, since logarithmic equations best describe data that produce a rapid decrease during initial periods followed by a leveling off period (Steel and Torrie 1980). From 1971 to 1999 there was a reduction in Authorized AUMs of approximately 600,000 AUMs. As was discussed in the previous section there are significant yearly fluctuations in AUMs based on precipitation and livestock prices. However, there has also been an overall downward trend, which might be a result of resource conditions and policy changes related to livestock grazing. If the trend as depicted in Figure 16 is correct, then over the next 20 years there could be an additional 125,000 AUM reduction. It is apparent from this projection chart that decreases in AUMs may continue, but at a much reduced rate, to the point of nearly leveling

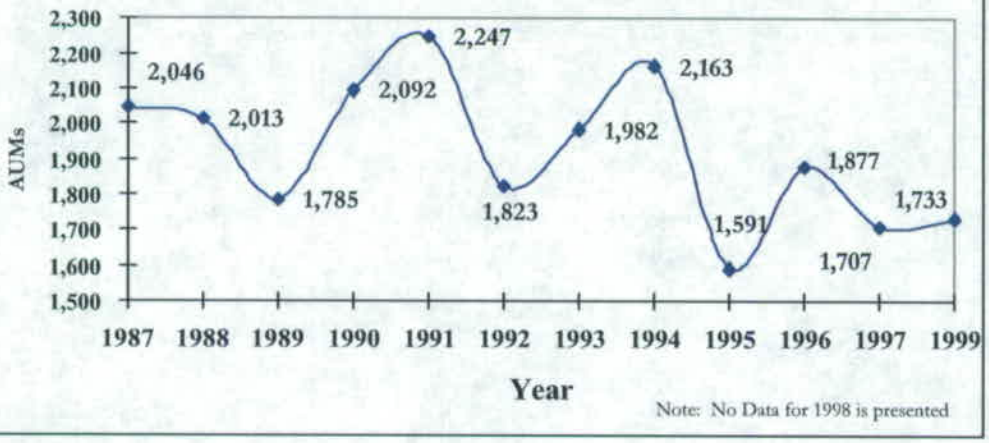
off. It is also important to realize that trend extrapolation to the future is just a tool; it does not guarantee the prediction will be realized.

NATIONAL PARK SERVICE DATA

Great Basin National Park

As previously mentioned in this report, grazing on lands now known as the Great Basin National Park was managed by the USFS until 1986. From 1987 through 1999 there has been a reduction in grazing AUMs on GBNP lands from 2,046 to 1,739 AUMs, a 15 percent reduction (Figure 17).

Figure 17. Great Basin National Park Grazing History



Note: No Data for 1998 is presented

Lake Mead National Recreation Area

Livestock grazing at the Lake Mead National Recreation Area (LMNRA) has historically been administered by the BLM. The LMNRA allotments are therefore tabulated within the BLM section of the NGS database. LMNRA was under a cooperative agreement with BLM until 1998. At that time the LMNRA chose not to renew the agreement because grazing activities had been greatly reduced. There are currently five allotments on LMNRA lands:

- Christmas Tree Pass Allotment – closed to grazing

- Black Mountain Allotment – currently not grazed and considered for closure
- White Basin Allotment - currently lightly grazed (under 10 head) and considered for closure
- Bunkerville Allotment – closed but the closure is under dispute
- Gold Butte Allotment – closed to grazing

Reasons for AUM Reductions

Included in the NGS database are fields for notes and reasons for changes in AUMs between 1980 and 1995, and between 1995 and 1999. Every effort was made during the data collection process to compile reasons for every AUM change. However, information was not always available.

Ten broad categories were selected to represent major reasons for changes in AUMs. Those categories include: boundary changes, change of class of livestock, Final Multiple Use Decision (FMUD – usually resource related), Forest Service Enhancement Act, permit violations, resource related (monitoring data suggested that too many livestock were utilizing the allotment, or other resource type decisions), transfer of ownership, other, unknown (the record was reviewed but no reason for change could be found), and no change.

The numbers provided in each reason section in the following tables represent a net gain or loss. Each category may have had losses and gains. What is reported in each table is the overall loss or gain.

Reasons for BLM AUM Reductions

Of the 374,045 BLM AUM reduction that occurred in Nevada from 1980-1999, reasons are presented for 209,958 (56%) AUMs (Table 1). This leaves 164,087 AUMs without explanation. The reason the database contains records with AUM changes, but absent explanation for the changes can be attributed to several factors. Among them, BLM records did not contain reasons, or reasons were not entered into the original database, prior to this phase of the project.

The resource related and the permit violation categories are the two categories of importance for AUMs changes in the BLM data. Those two categories alone account for over 1/3 of the reductions in AUMs on BLM lands.

Table 1. BLM AUM Changes from 1980-1999 by database category.

Reason	AUMs	Percent of Total Change
No reason given in the database	164,087	44
Resource Related	89,619	24
Permit Violation	35,210	9
Change in Class of Livestock	34,179	9
Forest Service Enhancement Act	19,189	5
Transfer of Ownership	11,863	3
Final Multiple Use Decision	10,485	3
Boundary Change	9,413	3
Total	374,045	100

Reasons for USFS AUM Reductions

Of the 86,289 AUM reduction on USFS lands in Nevada during 1980-1999, 61,059 AUMs had a corresponding reason attached to the database file (Table 2). The three primary categories accounting for reduction in USFS AUMs are boundary changes, resource related, and permit violations. These three categories can account for 74,908 (87%) of the AUM reduction from 1980-1999.

Table 2. USFS AUM Changes from 1980-1999 by database category. Parentheses equal an increase in AUMs.

Reason	AUMs	Percent of Total Change
Boundary Change	41,517	48
No reason given in the database	25,230	28
Resource Related	19,719	23
Forest Service Enhancement Act	(17,605)	(20)
Permit Violation	13,672	16
Transfer of Ownership	5,716	7
Change of Class of Livestock	(1,960)	(2)
Total	86,289	100

Actual Use

The Ely BLM compiled a record of actual use versus Permitted AUMs (Ely Field Office Actual Use Analysis Report). It is shown in their report, that the Ely Field Office actual use is consistently less than 50 percent of the permitted use. When comparing authorized use (which is more similar to actual use than permitted use) with permitted use data for the entire state of Nevada BLM lands the authorized use was 58 percent in 1980, 78 percent in 1995, and 71 percent of permitted use in 1999. This suggests that the remaining percentage of permitted use is held in voluntary non-use. Permittees may take voluntary non-use to protect the resource, in response to market conditions, and other business and resource related decisions.

Economic Impacts

The University Center for Economic Development, University of Nevada, Reno conducted the economic analysis for this project. Potential estimated economic impacts to rural Nevada resulting from changes in livestock AUMs were calculated using the Micro IMPLAN model developed by the U.S. Forest Service. The model estimates sectoral and regional impacts of alternative forest management scenarios (Alward et al. 1989). The IMPLAN model has been further revised by the University of Minnesota to accommodate analyses of other impacts, such as livestock number fluctuations.

The period of economic analysis for all Federal lands in Nevada is from 1980-1999. The reason 1980 was chosen as the starting year was that it was the earliest year for which complete USFS data could be obtained, and therefore, was the earliest year where comparison among all Federal land management agencies could be conducted.

Input-Output Models

The IMPLAN model is an input-output (I/O) economic model. I/O analysis is a valuable tool used to estimate the economic impacts of a change or "shock" to a local, state, or regional

economy. An input-output model is essentially a mathematical representation of the purchases and sales patterns of a regional economy. The model is used to estimate total regional impacts to output, employment, and income at a given point in time. The total impact of any "shock" to the economy consists of direct, indirect, and induced impacts. Direct impacts are those activities or changes in production level of the impacted industry. Indirect impacts occur throughout the economy as a result of providing goods and services to the impacted industry. The induced impacts are those impacts caused by household consumption as a result of the direct and indirect impacts.

This widely used modeling procedure uses multipliers to estimate the effects a change within one sector has on the total economy. Alternate scenarios can easily be considered to evaluate the changes in economic activity, household income, and total employment.

I/O Model Application

There are numerous ways to analyze the impacts of public land grazing policy. As discussed by Torrell et al. (1998) there are five potential ranch-level economic impacts from changes in grazing policies that can be analyzed or used to evaluate regional economic impacts. These are: 1) public land grazing costs, 2) the number of AUMs of federal forage available, 3) changes in season of use, 4) changing the class of livestock allowed to graze and, 5) the uncertainty created by changing grazing policies. Most ranch-level impacts can be estimated using livestock cost and returns estimates or linear programming techniques. However, economic impacts of increases or decreases in the number of AUMs of public forage available can be estimated using I/O models (Darden et al. 2001).

To calculate the direct impacts of AUM losses a total value of output lost or value of output lost per AUM must be calculated. Total value of production for the range cattle sector in Nevada was based on a five-year average derived from Nevada Agricultural Statistics Service (NASS 1996-2000) estimates for all cattle from 1995 through 1999. The five-year average value of production was estimated to be $85,334,757. The second step was to find how many AUMs there are in the state of Nevada regardless of source. The total number of AUMs in Nevada was estimated to be 3,496,800 (includes private land). This value was based on Workman's (1986)

evaluation that for a 300-cow operation, 4,464 total AUMs are required for all classes of cattle for the year. This results in a factor of 1.24 AUMs for every cow animal unit (AU) [4464 ÷ (300 A 12)] = 1.24). Multiplying the 1.24 AUMs/Cow by NASS' estimate of 235,000 cows yields approximately 3,496,800 AUMs in the state of Nevada. By dividing the value of production by the total estimated AUMs, a value of output of $24.40 was estimated for each AUM.

Table 3 shows the impact of one AUM on the State of Nevada's economy. The direct impacts are simply the change in output or sales to final demand occurring in the economy. The total industry impacts or output impacts to Nevada's economy from one AUM of grazing is $40.40. These are the impacts to the different sectors in the economy that occur because of the Range Livestock sectors interactions with them. The labor income impacts, which includes wages and salaries of workers and proprietors income, amounts to $7.40 per AUM of which $3.40 per AUM are direct income impacts to the range cattle industry. Total value-added impacts include those impacts to wages and salaries, proprietors' income, other property income, and indirect business taxes. Other property income is defined as payments received from interest, rents, royalties, dividends, and profits while indirect business taxes are defined as excise and sales taxes paid by individuals to businesses but do not include taxes on profit or income (Olson and Lindall 1999). The value-added impacts amount to $13.00 per AUM. The total economic impacts, which include the industry impacts and value added impacts, totaled to $53.40 per AUM with $29.40 in direct and $24.00 in indirect and induced impacts (Table 3). The employment based on $24.40 direct industry impact is too small to have any impact directly or indirectly based on one AUM of production. It takes $112,471 of increased or decreased Range Cattle Sector output to change one job. The employment impacts are reported in the number of jobs, not full-time equivalents, so full and part-time employment is included in all estimates.

Table 3. Economic Impacts of 1 AUM of Grazing in Nevada			
Value of AUMs = $24.40 AUM Increase or Loss = 1 Value of Production per AUM (5 yr. Avg.) = $24.40			
Impact	**Direct Impacts**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	$24.40	$16.00	$40.40
Total Labor Income Impact	$3.40	$4.00	$7.40
Total Value-Added Impact	$5.00	$8.00	$13.00
Total Employment Impacts	0.00	0.00	0.00
Total Economic Impacts[1]	$29.40	$24.00	$53.40

ASSUMPTIONS FOR THIS PROJECT'S ECONOMIC ANALYSIS

To estimate direct economic impacts to the livestock sector from past changes in livestock numbers, the total changes were determined and valued at 1997 gross market value. The 1997 IMPLAN model was then used to estimate economic impacts to the State of Nevada and various regions of the state resulting from fluctuations in livestock AUMs. Industries such as range livestock, crops, construction, manufacturing, transportation, communication, utilities, and trade and services were included in the IMPLAN model. The input-output model derived the interdependence of these industries in the local economy. Specific assumptions made for the economic analysis include:

- The permitted grazing within the Nevada USFS Ranger Districts analyzed decreased by 86,289 AUMs between 1980 and 1999, public land grazing on Nevada BLM lands decreased by 374,045 AUMs between 1980 and 1999, Nevada USFWS administer lands had a loss of 25,176 AUMs between 1980 and 1999, Nevada Bureau of Reclamation administered lands had an increase of 10,218 AUMs between 1980 and 1999, and National Park Service lands had a decrease of 313 AUMs between 1986 and 1999. In 1986 the GBNP was created using, in part, 8 allotments from the Ely Ranger District. Under GBNP management there has been a documented 313 AUM decrease between

1986 and 1999. These reductions reflect changes in maximum permitted allowable grazing, not actual use. Although permittees may elect to take temporary non-use, it was assumed that every permittee had the opportunity to operate to the limit of their total allowable grazing.

- The gross market value of livestock per AUM is constant and equal to $293 per AUY (Animal Unit Year). This value was derived as described in the previous section. As described by Workman (1986), a cow-calf ranch generally has about 1.35 AUY for each brood cow once other livestock classes are considered.
- No substitution between input variables was allowed. A constant, proportionate share of production factors was assumed.
- All cattle sold were exported from the State at the time of sale.
- Grazing permits have a market value and this value is eliminated without compensation whenever reductions in allowable grazing are made. The current market value of Nevada grazing permits was estimated to average $37 per AUM for BLM permits and $42 per AUM for USFS permits, as reported by U.S. Department of Interior (1993) for Idaho.

The data in the following economic analysis sections are presented in tables for each area of concern. The tablature presentation contains the actual numbers generated by the IMLAN model. For discussion purposes economic impacts were rounded to the nearest 100,000.

The BLM AUMs (and for the other agencies as well) used in this analysis were permitted numbers, i.e., the total number of livestock permitted, not the actual numbers grazed. Therefore, this is a theoretical economic impact, based on the assumption that the maximum permitted numbers had occurred.

Economic Impacts for all Federal Lands in Nevada

The analysis in this section estimated economic impacts to Nevada's economy based on a loss of 473,553 AUMs on all Federal lands in Nevada during 1980 through 1999. Total impact to the livestock industry from changes in the number of AUMs on Federal Lands in Nevada from 1980

to 1999 was a loss of $11,600,000 and total economic impacts to Nevada's economy was a loss of $24,800,000 for the 19-year period (Table 4).

Table 4. All Federal Land Impacts 1980 – 1999

Value of AUMs = ($11,554,693)
AUM Loss = (473,553)
Value of Production per AUM (5 year average) = $24.40

Impact	Direct Impact	Indirect/Induced Impacts	Total Impacts
Total Industry Impacts	($11,554,693)	($7,449,177)	($19,003,870)
Total Labor Impact	($1,608,186)	(2,036,281)	($3,644,467)
Total Value-Added Impact	($2,194,598)	($3,556,753)	($5,751,351)
Total Employment Impacts	(103)	(78)	(181)
Total Economic Impacts	($13,749,291)	($11,005,930)	($24,755,221)

Economic Impacts Directly Related to BLM Lands in Nevada

This section's analysis contains summaries of the estimated economic impacts to Nevada's economy based on a loss of 374,045 in AUMs on BLM lands specifically. Total impact to the livestock industry from changes in the number of AUMs on BLM Lands in Nevada from 1980 to 1999 was a loss of $9,100,000 and total economic impacts to Nevada's economy was a loss of $19,600,000 for the 19-year period (Table 5).

Table 5. BLM Impacts 1980 – 1999

Value of AUMs = ($9,129,698)
AUM Loss = (374,045)
Value of Production per AUM (5 year average) = $24.40

Impact	Direct Impact	Indirect/Induced Impacts	Total Impacts
Total Industry Impacts	($9,126,698)	($5,883,877)	($15,010,575)
Total Labor Impact	($1,270,257)	($1,608,396)	($2,878,653)
Total Value-Added Impact	($1,733,446)	($2,809,370)	($4,542,816)
Total Employment Impacts	(81)	(62)	(143)
Total Economic Impacts	($10,860,144)	($8,693,247)	($19,553,391)

Explanation of the Economic Analysis at the Field Office Level

At the beginning of each Field Office economic analysis section is a list of counties that were modeled with IMPLAN. The reason for this is that the model is not written to allow dividing counties for analysis. Therefore, if a Field Office Boundary bisects a county the economic analysis results are for the entire county. Therefore, if two or more Field Offices have allotments in the same county the economic impacts from all Field Offices involved with the county in question can not be added together to produce a regional impact.

Economic Impacts Attributed to the Battle Mountain BLM Field Office

IMPLAN modeled Esmeralda, Eureka, Nye, and Lander counties for the 1997 model year. During the 1980 to 1999 period the Battle Mountain Field Office had a 130,216 AUM reduction, with a corresponding economic loss to the livestock sector of Nevada's economy of $3,200,000 and a total statewide economic loss of $6,700,000 (Table 6).

Table 6. Battle Mountain BLM Field Office Impacts 1980 – 1999

Value of AUMs = ($3,177,270)
AUM Loss = (130,216)
Value of Production per AUM (5 year average) = $24.40

Impact	Direct Impact	Indirect/Induced Impacts	Total Impacts
Total Industry Impacts	($3,177,270)	($1,993,046)	($5,170,316)
Total Labor Impact	($494,785)	($401,744)	($896,529)
Total Value-Added Impact	($675,242)	($821,799)	($1,497,041)
Total Employment Impacts	(30)	(25)	(55)
Total Economic Impacts	($3,852,512)	($2,814,845)	($6,667,357)

Economic Impacts Attributed to the Carson City BLM Field Office

IMPLAN modeled Washoe, Nye, Douglas, Churchill, Storey, Carson City, and Lyon Counties for the 1997 model year. During the 1980 to 1999 period AUMs were reduced by 32,824 within the Carson City Field Office, with a resultant economic loss to the livestock sector of Nevada's economy of $800,000, and a total statewide economic loss of nearly $1,800,000 (Table 7).

Table 7. Carson City BLM Field Office Impacts 1980 – 1999			
Value of AUMs = ($800,906) AUM Loss = (32,824) Value of Production per AUM (5 year average) = $24.40			
Impact	**Direct Impact**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	($800,906)	($573,543)	($1,374,449)
Total Labor Impact	($90,668)	($148,005)	($238,673)
Total Value-Added Impact	($124,132)	($257,755)	($381,887)
Total Employment Impacts	(10)	(7)	(17)
Total Economic Impacts	($925,038)	($831,298)	($1,756,336)

Economic Impacts Attributed to the Elko BLM Field Office

The IMPLAN model looked at Elko, Eureka, and Lander Counties for the 1997 model year. During the 1980 to 1999 period the Elko Field Office had a 44,311 AUM reduction, with a corresponding economic loss to the livestock sector of Nevada's economy of $1,100,000 and a total statewide economic loss of $2,400,000 (Table 8).

Table 8. Elko BLM Field Office Impacts 1980 – 1999			
Value of AUMs = ($1,081,188) AUM Loss = (44,311) Value of Production per AUM (5 year average) = $24.40			
Impact	**Direct Impact**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	($1,081,188)	($803,295)	($1,884,483)
Total Labor Impact	($155,195)	($179,266)	($334,461)
Total Value-Added Impact	($211,312)	($337,006)	($548,318)
Total Employment Impacts	(8)	(9)	(17)
Total Economic Impacts	($1,292,500)	($1,140,301)	($2,432,801)

Economic Impacts Attributed to the Ely BLM Field Office

The IMPLAN model used White Pine, Lincoln, and Nye Counties for the 1997 year. During the 1980 to 1999 period AUMs were reduced by 96,395 within the Ely Field Office, with a resultant economic loss to the livestock sector of Nevada's economy of $2,400,000 and a total statewide economic loss of nearly $5,200,000 (Table 9).

Table 9. Ely BLM Field Office Impacts 1980 – 1999			
Value of AUMs = ($2,352,038) AUM Loss = (96,395) Value of Production per AUM (5 year average) = $24.40			
Impact	**Direct Impact**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	($2,352,038)	($1,488,967)	($3,841,005)
Total Labor Impact	($497,353)	($370,385)	($867,738)
Total Value-Added Impact	($678,929)	($722,155)	($1,401,084)
Total Employment Impacts	(36)	(25)	(61)
Total Economic Impacts	($3,030,967)	($2,211,122)	($5,242,089)

Economic Impacts Attributed to the Las Vegas BLM Field Office

IMPLAN modeled Clark, Lincoln, and Nye Counties for the 1997 model year. During the 1980 to 1999 period AUMs were reduced by 16,931 within the Las Vegas Field Office, with a resultant economic loss to the livestock sector of Nevada's economy of $400,000 and a total statewide economic loss of over $800,000. It is important to remember that these numbers represent ephemeral type allotments (Table 10).

Table 10. Las Vegas Field Office Impacts 1980 – 1999			
Value of AUMs = ($413,116) AUM Loss = (16,931) Value of Production per AUM (5 year average) = $24.40			
Impact	**Direct Impact**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	($413,116)	($215,805)	($628,921)
Total Labor Impact	($73,988)	($64,010)	($137,998)
Total Value-Added Impact	($100,906)	($118,865)	($219,771)
Total Employment Impacts	(8)	(4)	(12)
Total Economic Impacts	($514,002)	($334,670)	($848,692)

Economic Impacts Attributed to the Surprise and Eagle Lake BLM Field Offices

IMPLAN modeled Washoe and Humboldt Counties for the 1997 model year. During the 1980 to 1999 period AUMs were reduced by 7,260 within the Susanville Field Office, with a resultant

economic loss to the livestock sector of Nevada's economy of $200,000 and a total statewide economic loss of nearly $400,000 (Table 11).

Table 11. Surprise and Eagle Lake BLM Field Offices Impacts 1980 – 1999			
Value of AUMs = ($177,144) AUM Loss = (7,260) Value of Production per AUM (5 year average) = $24.40			
Impact	**Direct Impact**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	($177,144)	($107,014)	($284,158)
Total Labor Impact	($20,915)	($29,914)	($50,829)
Total Value-Added Impact	($28,528)	($51,950)	($80,478)
Total Employment Impacts	(1)	(1)	(2)
Total Economic Impacts	($205,672)	($158,964)	($364,636)

Economic Impacts Attributed to the Winnemucca BLM Field Office

The IMPLAN model evaluated Washoe, Churchill, Humboldt, and Pershing Counties for the 1997 model year. During 1980 through 1999 46,108 AUMs were removed from Winnemucca Administered BLM lands, with a resultant economic loss to the livestock sector of Nevada's economy of $1,100,000 and a total statewide economic loss of $2,400,000 (Table 12).

Table 12. Winnemucca BLM Field Office Impacts 1980 – 1999			
Value of AUMs = ($1,125,035) AUM Loss = (46,108) Value of Production per AUM (5 year average) = $24.40			
Impact	**Direct Impact**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	($1,125,035)	($783,352)	($1,908,387)
Total Labor Impact	($129,675)	($206,973)	($336,648)
Total Value-Added Impact	($177,071)	($359,123)	($536,194)
Total Employment Impacts	(8)	(8)	(16)
Total Economic Impacts	($1,302,106)	($1,142,475)	($2,444,581)

ECONOMIC IMPACTS DIRECTLY RELATED TO USFS LANDS IN NEVADA

The analysis summary in this section contains results of the estimated economic impacts to Nevada's economy based on a loss of 86,289 AUMs on USFS lands in Nevada. The USFS AUMs used in this analysis were permitted numbers, i.e., the total number of livestock

permitted, not the actual numbers grazed. Therefore, this is a theoretical economic impact, based on the assumption that the maximum permitted numbers had occurred. Total impact to the livestock industry from changes in the number of AUMs on USFS Lands in Nevada from 1980 to 1999 was a loss of $2,100,000 and total economic impacts to Nevada's economy was a loss of $4,500,000 for the 19-year period (Table 13).

Table 13. USFS Impacts 1980 – 1999

Value of AUMs = ($2,105,452)
AUM Loss = (86,289)
Value of Production per AUM (5 year average) = $24.40

Impact	Direct Impact	Indirect/Induced Impacts	Total Impacts
Total Industry Impacts	($2,105,452)	($ 1,357,360)	($3,462,812)
Total Labor Impact	($293,037)	($371,043)	($664,080)
Total Value-Added Impact	($399,891)	($648,097)	($1,047,988)
Total Employment Impacts	(19)	(14)	(33)
Total Economic Impacts	($2,505,343)	($2,005,457)	($4,510,800)

Economic Impacts Directly Related to USFWS Lands in Nevada

Estimated economic impacts to Nevada's economy based on a loss of 25,176 AUMs on USFWS lands in Nevada are contained in this section. Total impact to the livestock industry from changes in the number of AUMs on USFWS Lands in Nevada from 1980 to 1999 was a loss of $600,000 and total economic impacts to Nevada's economy was a loss of $1,300,000 for the 19-year period (Table 14).

Table 14. USFWS Impacts 1980 – 1999

Value of AUMs = ($614,294)
AUM Loss = (25,176)
Value of Production per AUM (5 year average) = $24.40

Impact	Direct Impact	Indirect/Induced Impacts	Total Impacts
Total Industry Impacts	($614,294)	($396,028)	($1,010,322)
Total Labor Impact	($85,498)	($108,257)	($193,755)
Total Value-Added Impact	($116,674)	($189,091)	($305,765)
Total Employment Impacts	(6)	(4)	(10)
Total Economic Impacts	($730,968)	($585,119)	($1,316,087)

Economic Impacts Directly Related to BOR Lands in Nevada

Estimated economic impacts to Nevada's economy based on an increase 10,218 AUMs on BOR lands in Nevada are reported in this section. Therefore, this is a theoretical economic impact, based on the assumption that the maximum permitted numbers had occurred. Total impact to the livestock industry from changes in the number of AUMs on BOR Lands in Nevada from 1980 to 1999 was a gain of $250,000 and total economic impacts to Nevada's economy was a gain of $500,000 for the 19-year period (Table 15).

Table 15. BOR Impacts 1980 – 1999

Value of AUMs = $249,319
AUM Increase = 10,218
Value of Production per AUM (5 year average) = $24.40

Impact	Direct Impact	Indirect/Induced Impacts	Total Impacts
Total Industry Impacts	$249,319	$160,733	$410,052
Total Labor Impact	$34,700	$43,937	$78,637
Total Value-Added Impact	$47,354	$76,745	$124,099
Total Employment Impacts	2	2	4
Total Employment Impacts	$296,673	$237,478	$534,151

Economic Impacts Directly Related to NPS Lands in Nevada

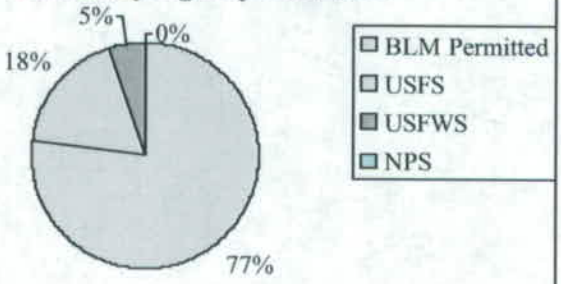
This economic analysis section contains the results for the estimated economic impacts to Nevada's economy based a loss of 313 AUMs on NPS lands in Nevada. Total impact to the livestock industry from changes in the number of AUMs on NPS lands in Nevada from 1985 to 1999 was a loss of $8,000 and total economic impacts to Nevada's economy was a loss of $16,000 for the 14-year period (Table 16).

Table 16. NPS Impacts 1985 – 1999			
Value of AUMs = ($7,637) AUM Loss = (313) Value of Production per AUM (5 year average) = $24.40			
Impact	**Direct Impact**	**Indirect/Induced Impacts**	**Total Impacts**
Total Industry Impacts	($7,637)	($4,923)	($12,560)
Total Labor Impact	($1,063)	($1,346)	($2,409)
Total Value-Added Impact	($1,451)	($2,351)	($3,802)
Total Employment Impacts	(0.10)	0.00	(0.10)
Total Employment Impacts	($9,088)	($7,274)	($16,362)

Economic Summary

Figure 18 illustrates that BLM contributed 77 percent of the economic losses in Nevada as a result of changes in AUMs on Nevada's public lands. The USFS contributed 18 percent, USFWS 5 percent, and the NPS less than 1 percent of the total economic loss to Nevada from 1980 to 1999. BOR grazing changes represented a positive impact, though an insignificant economic contribution when analyzing state wide economic impacts. The BLM economic impact is logically given that BLM is by far the largest Federal Land management agency in Nevada.

Figure 18. Total Economic Loses in Nevada by Agency 1980-1999



DISCUSSION

One year of intensive data collection and data summary by agencies, NACO, Nevada Department of Agriculture, and RCI personnel have culminated in this report to be presented to the Nevada Legislature.

Contained in the previous pages are a summary of Federal Land Grazing trends for Nevada, and the corresponding impacts that those grazing trends may have had on Nevada's Economy. It is evident that decisions to increase or decrease livestock numbers on federal lands in Nevada have an important trickle down impact to the economy. Land managers making grazing decisions should be cognizant of the impacts that their decisions have on the local economy. These decisions have resulted in negative impacts to Nevada's economy.

NGS Database Summary

A beneficial aspect of this project is that now all federal land grazing records are contained in an Access database (the NGS Database) that is linked to an ArcView GIS database. Therefore, someone who has an interest in local impacts may go to the GIS map, zoom to an area of concern and find allotment mapping which will contain relative information for the allotment. That individual may then go to the Access database and produce summary reports on their area of concern. Those reports will show changes in AUMs, permittee name, allotment name, among other important items for the region of interest.

Agency personnel have contacted RCI with requests for grazing data for their respective administrative units. They seek this information for inclusion in their environmental documents under preparation. It is apparent that agency personnel acknowledge the NGS database as the most comprehensive grazing database for Nevada. Beyond that, it is safe to say it is the most comprehensive and up to date database in the nation for public land grazing. The NGS database is a powerful tool that should be used in cooperation among NACO, the Nevada Department of Agriculture, and the agencies to maintain a working knowledge of grazing in Nevada.

Results Summary

In summary, the NGS data gathering and analysis has identified the following economic and AUM changes occurred in Nevada from 1980-1999.

- Combined federal land AUMs lost in the state of Nevada from 1980 through 1999 were 473,553 (16%) with a corresponding negative $24,800,000 estimated impact to Nevada, and a negative $11,600,000 estimated impact to Nevada's livestock industry.
- Impacts to BLM lands included a loss of 374,045 (14%) permitted AUMs and an estimated negative $19,600,000 economic impact to Nevada with a $9,100,000 estimated loss to Nevada's livestock industry for the 19-year period evaluated in this study.
- USFS administered lands realized an estimated loss of 86,289 AUMs (23%) and an estimated economic loss of $4,500,000 to Nevada, with a $2,100,000 negative estimated impact to Nevada's livestock industry.
- A loss of 25,176 AUMs (78%) were realized on USFWS administered lands (Ruby, Stillwater, Sheldon-Hart, Pahranagat National Wildlife Refuges) from 1980-1999 with $1,300,000 estimated loss to Nevada's economy and $600,000 estimated losses to the Nevada livestock industry.
- BOR lands saw an increase of 10,218 AUMs and a resultant $500,000 estimated positive impact to Nevada's economy and $250,000 to Nevada's livestock industry.
- NPS lands lost 313 AUMs with a corresponding estimated loss to the Nevada livestock industry of $8,000 and a $16,000 loss to Nevada's economy as a whole.

Highlighted throughout this report is the downward trend of livestock grazing experienced on Nevada public lands over the last 19 years. This trend is likely a result of many factors, including environmental, ecological, sociological, and administrative policy.

BLM AUM reductions since adjudication amount to a 468,114 AUM decrease. Prior to adjudication there were an additional 419,755 historical suspended AUMs. Therefore, during the tenure of BLM land management in Nevada there have been approximately 890,000 AUMs removed from Nevada BLM rangelands. The historical suspended AUMs represent a reduction in AUMs prior to adjudication, but not analyzed in this study.

This report contains information that is useful to land managers, policy makers, and others when discussing Nevada's public land grazing. The database, and associated GIS mapping, are an invaluable tool that should be continually maintained and updated for future users.

Grazing on Federal Lands – A Perspective

The results of this study have shown that for both the USFS and BLM more than 1/3 of the AUM reductions were related to permit violations, or resource related categories. These two categories include more specific causes including: trespass violations (excessive time on an allotment, or too many animals, or both; or an unauthorized permit), non-payment, exceeding standards and guidelines, evaluation based reduction, carrying capacity estimates, Threatened and Endangered species conflicts, wildlife conflicts, and wild horse competition. The following discussion offers our (the consultants) insights into public land grazing in Nevada. The following discussion combines our collective public land grazing knowledge with the results of this study.

BLM and USFS grazing permits were historically issued for 10-year periods, which provided some assurance that public land ranch operations would remain viable. The permit stability was also important to lenders who made loans to ranchers. Only after knowing that a ranch operation was secure and public land grazing permits were not threatened, would a financial lender provide a loan to an operator. While assurances for permit stability generally existed, there was no guarantee that permits would remain with a permittee for the 10-year period. Agencies could either adjust or cancel a permit if necessary, based on perceived resource conditions, permit violations, or for a variety of other reasons.

Historically, permittees and agencies together provided extensive range improvements across the public lands, most of this occurring prior to the environmental legislation of the 1970's and 1980's. The National Environmental Policy Act (NEPA), Public Rangeland Improvement Act (PRIA), Federal Lands Policy and Management Act (FLPMA), Forest Management Act (FMA), and other laws elevated a new awareness and greater public participation in public lands policy and planning. In addition, the environmental legislation increased public awareness and curtailed range improvement activities. Fewer range improvements resulted because proposed

projects first had to be cleared through a land use plan, cultural resource review, and by NEPA documentation. Agencies were now overburdened with land use plans and NEPA documentation and found limited time to devote to on-the-ground management of allotments. During this period the BLM also committed to one-point-in-time range surveys to once again determine initial stocking rates, despite recommendations from the scientific community that one-point-in-time range surveys were not the most accurate approach. The BLM's one-point-in-time range surveys effort was thwarted following extensive scientific review and documentation of the agency's methodologies. Rangeland Monitoring was recommended as a more technically sound method to replace the questionable one-point-in-time ocular surveys. The BLM relented and abandoned one-point-in-time surveys and committed to monitoring. In 1981, a coordinated effort was initiated in Nevada to develop a Nevada Rangeland Monitoring Handbook (NRMH) with USFS, BLM, USDA-ARS, NRCS, UNR, and others participating.

RANGELAND MONITORING

While the NRMH provided methodologies appropriate for use in Nevada at the time, the agencies and their field offices varied in the methodology employed and intensity of application. In the mid 1980's, the BLM committed to a period of extensive monitoring to determine if allotments were overstocked and to assess rangeland trend. Also, during the 1980's, teams of BLM/NRCS Soil Scientists and Range Conservationists were mapping soils and correlating the vegetation to the soils. The soil mapping units, with corresponding vegetation, are referred to as Ecological Sites. These Ecological Sites provide the ability to identify the rangeland condition, available forage, wildlife habitat, soil descriptions, and a host of other information. While much of Nevada's BLM and private lands now have Ecological Site descriptions, the USFS has not adapted this methodology. This leaves a large void in the ability to evaluate ecological condition across land ownership for purposes of uniform assessments and interpretation. Each agency uses its own methodologies and to date have shown little interest in committing to a uniform process. The result is that the permittees' allotments are subjected to a variety of methodologies in the field.

SHORT TERM MONITORING

Agency decisions today are often being made on the basis of short term monitoring that looks at utilization levels on a limited number of "key" grazing areas for each allotment. If utilization levels are found to exceed the maximum allowable use level (generally, 30-60% of current year's growth) livestock operators can be penalized, or have their permit cancelled if the problem continues. The intent of short term monitoring is to know what is happening annually to natural resources for each allotment as a result of grazing management. Such questions as livestock distribution, utilization patterns, climate, insects, rodents, wildlife impacts, and other concerns need to be carefully documented and evaluated during short term monitoring and discussed with the permittee. The monitoring information should provide a clear picture of the year's events and assist in knowing how best to address these concerns in preparation for the next grazing season. Unfortunately, accurate short term monitoring may not always occur. Alternatively, because of the shortage of range management staffing, funding, or inexperienced staff the following may result: inadequate data collection, problems in data interpretation, limited contact with the operator, and little time might be spent on the allotment by the assigned agency personnel. This scenario can result in reduced grazing capacity and little or no attention to actual resource problems or opportunities. While the agencies do have experienced and fully qualified range specialists, their numbers are limited, given the workload now in place as a result of extensive size of regulation and requirements.

LONG TERM MONITORING

The scientific community has consistently recommended long term monitoring as the protocol for determining changes in rangeland condition-and-trend. Short term monitoring mostly provides year-to-year signals that assist in adjusting management. Reducing AUMs on the basis of over-utilization near a watering area, or a favored area where livestock locate on the allotment, most often will not improve resource condition. The "goal" of reducing AUMs is to reduce negative impacts to the resource. What usually occurs instead is that livestock, though reduced in numbers, return to the same heavily impacted areas producing the same negative

impacts. Without improving distribution through better management and installing range improvements livestock, as a force of habit, remain in the concentrated areas.

Short term monitoring shows the location of the concern and signals the need to change management direction for the next season. This is done regularly in the private world. If permanent, long term transects (study sites) are established on the allotment and read every 3-5 years, the studies will reflect the trend of the native plant community. In other words are the objectives being reached? Short term monitoring should be used in conjunction with long term monitoring.

Decisions and Penalties Based on Monitoring

When inadequate monitoring data is collected, and interpretation of the data is less than adequate, poor decisions regarding the land may follow. The recipient of that decision is typically the permittee, although the same can occur with other users. Because the grazing permit allows adjusting of livestock numbers based on resource condition, it is not difficult for the agency to control the permittee, through reduction of livestock numbers. Despite the recommendations of the scientific community, reductions are common on the basis of short term, or utilization monitoring. Utilization is a tool to assist in reaching an allotment objective. Too often the agencies use utilization as the objective and penalize the permittee when utilization standards are exceeded. Penalties based on guidelines that are punitive in nature, do little to improve the resource. When a problem is identified, the agency and permittee used to work ardently to correct the problem. Rather, the guideline effectively and systematically reduces the permit to the point where it is no longer feasible for the permittee to place livestock on the allotment. The permittee then is potentially forced to abandon or sell the permit. It is important to note that some reductions in AUMs are justified, premised on sound short term monitoring combined with long term trend studies.

Risks Associated With Abandoned Allotments

Numerous active allotments are not being grazed in parts of Nevada, because permits have been cancelled by the agency, or reductions have been imposed to the point that permittees can no

longer justify running on the permit. No use, is a choice, and is being employed over some areas today, but is oftentimes not necessarily the best choice. As forage plants and shrubs produce annual growth that is left unharvested, the rangeland potentially becomes decadent and unhealthy over time. If man with his animals, prescribed burns, or native wildlife, do not harvest the renewable plant growth on rangelands, then it is left for nature to consume through wildfire. We have had sufficient example of nature's harshness with the wildfires in Nevada over the past decade. Harvesting vegetation through herbivory is a natural biological process that accommodates rangeland health on a renewable and sustainable basis, as long as sound grazing management is applied.

The preponderance of evidence demonstrates that rangeland management has resulted in much improved rangeland condition over the past 60 years, when compared to the period prior to the 1940s. An exception is the vast cheatgrass infested area of northern Nevada that is subjected to annual sporadic wildfire. Currently, abundant cheatgrass areas combined with limited or restricted livestock use allows the cheatgrass to mature, thus curing into a flashy fuel. Cheatgrass fires, being extremely hot, destroy much of the remaining native perennial vegetation in its path. Livestock could be used as a tool to combat this condition while assisting in the rehabilitation of native species. The BLM, in cooperation with the scientific community, is presently conducting studies to determine the relevance of cheatgrass grazing for fuels management and range improvement.

Wild Horses and Livestock Grazing

Wild horse populations in Nevada have also influenced livestock reductions. Management of wild horses unfortunately requires an annual appropriation from Congress in order to continue gathering to the appropriate management levels (AML). If funding is reduced or unavailable, the wild horse numbers increase. When requested funding does eventually occur, the increased number of horses, and therefore the cost of removal, often far exceed the funds that are available. Thus, many allotments remain overstocked. As horse numbers increase beyond appropriate management levels dietary overlap and/or competition for available forage occurs with permitted livestock. Inevitably, livestock lose out in this scenario and their numbers are reduced. The

BLM controls the permit and can reduce livestock without much public complaint, but generally, proposed wild horse gathers, which result in reduced wild horse numbers, inspire negative publicity.

Mining and Ranching

When mining companies move into an area to conduct exploration or mining operations, boundaries are normally fenced around the mining operation to avoid conflict, or problems. While recognized as a permitted use, mining none-the-less effects livestock AUMs by withdrawing lands for a short period, or permanently. As acres are removed from the allotment to make room for mine operations, there is a corresponding loss of AUMs, unless it can be demonstrated that conditions are such that a livestock reduction will not be necessary. Mining companies and BLM now develop reclamation plans to assure revegetation of the disturbed mine lands. Livestock can sometimes be re-permitted for use of these areas, in which case the AUMs are not permanently retired. Because mining and ranching have co-existed on public lands for decades, they have learned how to work together to minimize impacts to each other's operations.

Wildlife Effects on Livestock Grazing

Wildlife introductions with species such as the desert bighorn sheep and rocky mountain elk have resulted in livestock AUM losses. There is continuing interest and support among the public to increase the numbers of elk and other big game on public lands. However, some permittees have experienced reductions in livestock use, or have been denied requests to increase numbers, under the premise that ranges are either fully stocked, or overstocked. Yet, elk and other competing wildlife species have been introduced, or allowed to pioneer into historical livestock use areas and wildlife numbers allowed to increase. This activity can rapidly create dietary overlap or direct competition for the same forage. Livestock grazing can come out on the short side of this scenario, as once again, the agency controls the permit and can justify reducing livestock numbers to accommodate wildlife. As elk numbers grow, more conflicts will no doubt surface in the rural areas of Nevada. With the big horn sheep introductions, domestic sheep have been limited to areas that are distant from the wild sheep, because of alleged disease transmission between the species. This loss of historic livestock grazing areas is threatening the future of an

already fragile sheep industry in Nevada. When wild sheep pressures force either a change in class of livestock, or abandonment of the permit, the sheep operators experience immense pressure to their lifestyle and economic well being.

ENDANGERED SPECIES

Another recognized threat to the livestock industry resulting in AUM reductions is the listing of threatened and endangered (T&E) species. Lahontan and Paiute cutthroat trout are examples of species that have been listed, resulting in stringent management requirements for occupied streams. These species are also being introduced into streams where they potentially had not existed. Efforts to minimize disturbance along streams has resulted in severe limitations on grazing, or in some cases, removal of livestock. New candidate species are continually being listed, or are recommended for listing. An example of a new potential species for listing is the sage grouse. It is possible that a listing of the sage grouse could eliminate livestock grazing over a vast region of the west, including a significant part of Nevada. Already, the willow flycatcher, a listed bird, has resulted in the removal or proposed removal of livestock from all occupied habitats in some plans. It's difficult to determine at this point, what the full impacts of the Endangered Species Act will have on livestock grazing and other industries over the coming years, but the outlook is not promising.

SUMMARY

There are continual pressures and challenges facing livestock grazing in Nevada. However, it is important to realize that grazing of rangelands is a manageable activity. It is the controlled harvest of a renewable, sustainable natural resource. The practice of grazing rangelands is possibly the best example of low-input agriculture known today, requiring very little fossil fuel when compared to many other forms of agriculture. Livestock are turned out to graze, rotated from one grazing unit to another, or herded through an area while harvesting forage. These animals convert natural forage into red meat protein for human consumption, along with other products. When viable, the livestock industry contributes positively to the economic well being of Nevada, and also helps to maintain a much needed diversified economy. In addition, managed grazing helps to sustain native plant communities and wildlife populations.

The causal effects listed above are responsible for much of the reductions in AUMs that have taken place over time in Nevada. Today, we have an opportunity to work cooperatively under present state and federal agency leadership to better plan and administer the management of Nevada's public land resources. A cooperative working relationship between the livestock permittees and the federal land management agencies, and uniform and consistent methods for assessing condition and trend of our rangelands are vitally needed. The livestock industry can, and should be, part of the solution, if included in development of allotment management plans, setting resource objectives, monitoring their grazing allotments, recording change, and implementing range improvements.

RECOMMENDATIONS

GIS and Database Applications

DATABASE IMPROVEMENT

Throughout the analysis portion of this project it became apparent that there are several changes that would enhance the database efficiency. For instance, the database should be modified to allow accurate reporting of the impacts that boundary changes have on the AUMs. Also, as noted in the reasons sections, there are many allotment records with no recorded explanations for AUM changes. For historical purposes it would be helpful to further the research effort to identify and record the reasons for changes in AUMs.

DATABASE MAINTENANCE

Over the last 5 years tremendous effort has been directed to this project by federal agencies staff, NACO staff, Nevada Department of Agriculture staff, and RCI. The resultant information is the best available historical and current record of livestock numbers and allotment boundaries available for Nevada. This information should be maintained and updated as new data becomes available. Efforts are currently underway to fund maintaining a database program. It will be valuable to all involved if continued funding is secured for the project.

A central location is needed to maintain the database where all new decision notices, evaluations, and relevant information is sent. The database could continually be updated as new information is received from agencies throughout the state.

BLM DATA

This report contains two sets of data for BLM grazing; permitted AUMs and authorized AUMs. Both of these numbers have value to those interested in public land grazing in Nevada.

Permitted numbers show what has been allocated as maximum total available livestock forage for BLM lands. Variations in this number may reflect changes in BLM policy actions resulting from resource evaluations at the allotment level.

Authorized numbers reflect the actual AUMs paid for by permittees and reflect management decisions by the permittee based on economics and environmental concerns. Changes in AUMs in the Authorized category also may reflect management adjustments imposed by BLM as a result of temporary resource conditions (such as fire).

Therefore, maintenance of current numbers for both sets of data has value. Since the NGS database is currently set up to monitor permitted numbers only, it would be advisable to create a field for each allotment where Authorized AUMs could be recorded in the future.

Methods to Improve Federal Land Grazing

The following is a list of recommendations to maintain healthy rangelands and a viable livestock industry in Nevada (recognizing that some agencies already implement portions of these recommendations):

- Use uniform long term monitoring methods for all agencies (i.e., standard monitoring methods for all agencies).
- Use scientific based monitoring methods appropriate to the resources of Nevada (as recommended by Nevada rangeland scientists).

- Develop cooperative and respectful interaction between livestock permittees and agency personnel when developing land management recommendations and decisions.

- Consider the economic impacts to permittees and local communities when making land management decisions.

- Set realistic resource objectives for allotments (i.e., do not use short term monitoring and utilization guidelines as objectives, as these are tools employed to achieve objectives).

- Adopt NRCS Ecological Sites for all public lands, and use them as a basis for management decisions.

- Livestock stocking rates should be amended based on long term monitoring supported by short term monitoring that includes allotment wide utilization mapping.

- Improve wild horse monitoring, management, and control methods as per the legal requirements to manage wild horses and burros within established Herd Management Areas.

- Balance the needs of wildlife and livestock through Allotment Management Plan (AMP) development.

- Use peer reviewed scientific information when making Threatened and Endangered species decisions that impact livestock grazing and rural economies.

- Commit funding and priority to AMP development and necessary range improvements to facilitate improved livestock distribution.

- Focus livestock management criteria on allotment-wide distribution as well as utilization of key areas.

- Use voluntary non-use as a mechanism for retaining AUMs while necessary range improvements and monitoring occur.

- Support the BLM's Great Basin Restoration Initiative and Eastern Nevada Landscape Restoration Project.

- Working cooperatively with the other representative agencies, et. al. Update the 1982 Nevada Rangeland Monitoring Handbook to more effectively reflect the present state of the science in Nevada.

CONCLUSION

This report has provided a description of AUM declines in Nevada and, as best possible, explanations for the changes. It is apparent that many factors influence AUM changes on public lands in Nevada. In our experience the primary forces driving the decline in livestock grazing have been:

- A change in public attitude toward grazing.
- A reluctance, or inability, of federal agencies to invest in rangeland improvement projects.
- A distrust, and sometimes poor working relationship, among federal land administrators, permittees, and the general public.
- Region wide resource condition decisions rather than site specific evaluations.
- A failure by some permittees to manage in the best interest of the resource.

Nevada public land grazing issues that permittees face today often are localized and related to livestock distribution problems, which can be resolved by site specific planning, as opposed to further AUM reductions. In the past, federal agencies have tended toward prescriptive grazing standard, regional or landscape based planning processes, and penalty driven program administration. These approaches offer little incentive or opportunity for private investment for site specific management solutions to address specific grazing issues. If continued, this approach will likely result in further declines in public land grazing and further adverse economic effects to the Nevada livestock industry, dependent rural economies, and local governments.

Collaboration and cooperation among agency staff, permittees, the scientific community, and the general public will help solve resource concerns. All groups and individuals involved with public land grazing have responsibilities to the natural resources; Federal agency personnel have a responsibility to provide resource management plans, provide objectives, and conduct monitoring based on sound scientific reasoning and an understanding of the needs of all who use public lands; Public land livestock operators are obligated to manage their operations with respect and concern for the resource, based on established rangeland management principles.

Sound resource management decisions based on site specific resource conditions, along with proper livestock management, will allow an economically viable livestock industry to prosper in Nevada.

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Workman, J.P. 1986. *Range Economics.* MacMillan Publ. Co. NY, NY. 217p.

APPENDIX I CD WITH RAW DATA

APPENDIX II PEOPLE PROVIDING INFORMATION

The following is a list of individuals who contributed information to this report.

BLM
State BLM Office
Robert Abbey, Brad Hines, Meg Jensen, Duane Wilson
Battle Mountain Field Office
Jeffrey Weeks
Carson City Field Office
James Gianola, Daniel Jacquet, Katrina Leavitt, Randy Mead, Pete Raffetto, Tracey Wolfe
Eagle Lake Field Office
K.C. Bordwell, Linda Hansen, Steve Surian
Elko Field Office
Clinton Oke, Jason Spense
Las Vegas Field Office
John Jamrog, Roy Lee
Ely Field Office
Alicia Gibson, Gene Kolkman, Eric Luse, James Perkins
Surprise Field Office
Bill Phillips, Susan Stokke
Tonopah Field Office
Valerie Metscher
Winnemucca Field Office
Rich Adams, Everett Bartz, Colin Christensen, Shane Findly, George Gamblin, Ron Pearson, Rhonda Purdy, Terry Reed, Gene Seidlitz

BOR
Locke Hahne
Truckee Carson Irrigation District
Lyman McConnell
Pershing County Water Conservation District
Nancy Bales, Bennie Hodges

GNOMON
Clint Celio, Eric Ingbar, Jeff Secor

Others: Mitch Bultos, Norm Sacke

NACO
Robert Hadfield, Michelle Gamble

NDA
Don Henderson

NPS
Great Basin National Park
Todd Williams
Lake Mead National Recreation Area
Jennifer Haley

UNR
Zack Bunyard, Tim Dardin, Tom Harris

USFS
State USFS Office
Gerald Grevstad
Elko Ranger District
Penny Stevens
Ruby Mountain Ranger District
Dave Aicher
Santa Rosa Ranger District
Steve Williams
White Mountain Ranger District
Del Hubbs, Bonnie Pritchard

USFWS
Pahranagat National Wildlife Refuge
Richard Berger
Stillwater National Wildlife Refuge
Kim Hanson
Ruby Lake National Wildlife Refuge
Martha Collins
Sheldon Hart National Wildlife Refuge
Steven Clay, Donna Withers

RCI
Gabe Fogarty, Sandy Jonkey, John McLain, Robert Pearce

APPENDIX III SUMMARY OF THE INFORMATION REQUESTED & COPIES OF LETTERS SENT AT PROJECT INITIATION

BLM Requested Information

The following information was requested from each BLM Field Office:

General Information

- Names of all allotments (and number) for each District.

For allotments where no data existed in the NGS database:

- Allotment Boundaries (maps)
- Name of current permittee(s)
- Access to field office files
- Reasons for AUM shifts, where they occurred
- All Decision Notices
- 1980 AUMs for all allotments (permitted preference)
- 1990 AUMs for all allotments (permitted preference)
- 1999 AUMs for all allotments (permitted preference)
- Term permits since adjudication for each allotment

For allotments where some data existed in the NGS database.

- Verify the 1999 information for allotment boundaries, permittee names, and AUMs
- If discrepancies exist between NGS data and BLM then staff will need access to files to find why discrepancies exist.
- Range Cons to provide time to meet with contractor at each district
- Reasons for shifts in AUMs

USFS Requested Information

The following information was requested for each Nevada Ranger District:

General Information

- Names of all allotments (and number) for each Ranger District.

For allotments where no USFS data existed:

- Allotment Boundaries (maps)
- Name of current permittee(s)
- Access to district office files
- Reasons for AUM shifts, where they occurred
- All Decision Notices
- 1980 AUMs for all allotments (authorized grazing use)
- 1990 AUMs for all allotments (authorized grazing use)
- 1999 AUMs for all allotments (authorized grazing use)
- Page 1 of the term grazing permits for each allotment (1980-1999)

For allotments where USFS data existed within the NGS database:

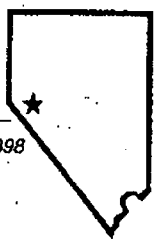
- Need to update NGS database information to 1999 for allotment boundaries, permittee names, and AUMs
- Range Cons provide time to meet with contractors
- Reasons for shifts in AUMs

USFWS, BOR, NPS Requested Information

The following information was requested from the other three Federal land agencies reviewed in this study:

- Names of all allotments (and number) for each District.
- Allotment Boundaries (maps)
- Name of current permittee(s)
- Access to office files
- Reasons for AUM shifts, where they occurred
- All Decision Notices
- 1980 AUMs for all allotments (permitted preference)
- 1990 AUMs for all allotments (permitted preference)
- 1999 AUMs for all allotments (permitted preference)

NACO
NEVADA ASSOCIATION OF COUNTIES
308 NORTH CURRY STREET, SUITE 205 • CARSON CITY, NEVADA 89703 (775) 883-7863 FAX (775) 883-7398



April 4, 2000

Rebeccca Mills
Superintendent
Great Basin National Park
Baker, NV 89311-9702

Dear Ms. Mills:

The 1999 Nevada Legislature appropriated funds to create a Nevada Public Land Grazing Database and Economic Analysis. While similar efforts have been done for particular areas of the State, no complete statewide database has ever been developed. In 1999, the Nevada Association of Counties published a report entitled "Reviving Nevada's Rural Economies" and in that report we encouraged research activities to address rural economic issues aimed at developing a comprehensive understanding of the role of public lands in relation to reviving Nevada's rural economies. As such, we were asked by the Nevada State Department of Agriculture to assist in fulfilling this legislative mandate.

The goal of this effort is to construct and accurately display information on public land grazing in Nevada. Once we have compiled this information, all compiled and verified records of individual grazing allotments will be subjected to an economic input and output model that has been regionally calibrated and verified by the Applied Economics and Statistics Department of the University of Nevada, Reno. The economic analysis will include a determination of the annual economic effect on the livestock industry, business sectors and governmental revenues and the economic effect on the income and property values of ranchers.

For this effort to be successful, we need your assistance. We have contracted with the consulting firm of Resource Concepts, Inc. (RCI) to help us obtain the required information to complete the database. We believe that the cooperative effort between the applicable federal agencies, the State of Nevada, the Nevada Association of Counties and Resource Concepts, Inc. will produce the highest quality report possible. Attachment A-1 shows the project area as defined by federal agency jurisdiction. For the Great Basin National Park, we will just need to update our existing information to 1999 for allotment boundaries, permittee name and AUM's along with time with the assigned agency person to verify and reconcile compiled grazing records and determine any reasons for shifts in AUM's

RCI also intends to bring their own photocopy machine to lessen the impact to your office. We must have the report completed by January 1, 2001 so it is our intent to begin gathering this information as soon as we can.

I know you understand the importance of this project to both the State as a whole and to Nevada's counties. I would like to follow up with you to answer any questions you may have about this effort and finalize our cooperative efforts with the Great Basin National Park to gather this information.

Sincerely,

Robert S. Hadfield
Executive Director

RSH/mg
attachments

NACO
NEVADA ASSOCIATION OF COUNTIES
308 NORTH CURRY STREET, SUITE 205 • CARSON CITY, NEVADA 89703 (775) 883-7863 FAX (775) 883-7398

April 4, 2000

Alan O'Niell
Superintendent
Lake Mead National Recreation Area
601 Nevada Highway
Boulder City, NV 89005

Dear Mr. O'Niell:

The 1999 Nevada Legislature appropriated funds to create a Nevada Public Land Grazing Database and Economic Analysis. While similar efforts have been done for particular areas of the State, no complete statewide database has ever been developed. In 1999, the Nevada Association of Counties published a report entitled "Reviving Nevada's Rural Economies" and in that report we encouraged research activities to address rural economic issues aimed at developing a comprehensive understanding of the role of public lands in relation to reviving Nevada's rural economies. As such, we were asked by the Nevada State Department of Agriculture to assist in fulfilling this legislative mandate.

The goal of this effort is to construct and accurately display information on public land grazing in Nevada. Once we have compiled this information, all compiled and verified records of individual grazing allotments will be subjected to an economic input and output model that has been regionally calibrated and verified by the Applied Economics and Statistics Department of the University of Nevada, Reno. The economic analysis will include a determination of the annual economic effect on the livestock industry, business sectors and governmental revenues and the economic effect on the income and property values of ranchers.

For this effort to be successful, we need your assistance. We have contracted with the consulting firm of Resource Concepts, Inc. (RCI) to help us obtain the required information to complete the database. We believe that the cooperative effort between the applicable federal agencies, the State of Nevada, the Nevada Association of Counties and Resource Concepts, Inc. will produce the highest quality report possible. Attachment A-1 shows the project area as defined by federal agency jurisdiction and Attachment A-2 indicates the information we need to collect for the Lake Mead National Recreation Area.

RCI also intends to bring their own photocopy machine to lessen the impact to your office. We must have the report completed by January 1, 2001 so it is our intent to begin gathering this information as soon as we can.

I know you understand the importance of this project to both the State as a whole and to Nevada's counties. I would like to follow up with you to answer any questions you may have about this effort and finalize our cooperative efforts with the Lake Mead National Recreation Area to gather this information.

Sincerely,

Robert S. Hadfield
Executive Director

RSH/mg
attachments

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NEVADA ASSOCIATION OF COUNTIES
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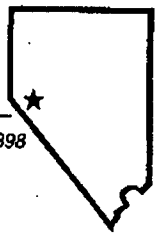


April 4, 2000

Elizabeth Rieke
Area Manager
Bureau of Reclamation
P.O. Box 640
Carson City, NV 89702

Dear Betsy:

The 1999 Nevada Legislature appropriated funds to create a Nevada Public Land Grazing Database and Economic Analysis. While similar efforts have been done for particular areas of the State, no complete statewide database has ever been developed. In 1999, the Nevada Association of Counties published a report entitled "Reviving Nevada's Rural Economies" and in that report we encouraged research activities to address rural economic issues aimed at developing a comprehensive understanding of the role of public lands in relation to reviving Nevada's rural economies. As such, we were asked by the Nevada State Department of Agriculture to assist in fulfilling this legislative mandate.

The goal of this effort is to construct and accurately display information on public land grazing in Nevada. Once we have compiled this information, all compiled and verified records of individual grazing allotments will be subjected to an economic input and output model that has been regionally calibrated and verified by the Applied Economics and Statistics Department of the University of Nevada, Reno. The economic analysis will include a determination of the annual economic effect on the livestock industry, business sectors and governmental revenues and the economic effect on the income and property values of ranchers.

For this effort to be successful, we need your assistance. We have contracted with the consulting firm of Resource Concepts, Inc. (RCI) to help us obtain the required information to complete the database. We believe that the cooperative effort between the applicable federal agencies, the State of Nevada, the Nevada Association of Counties and Resource Concepts, Inc. will produce the highest quality report possible. Following is our suggested course of action to obtain the necessary information, however, after your review of this letter, I welcome any suggestions you have that may make this process flow more smoothly.

Attachment A-1 shows the project area as defined by federal agency jurisdiction and Attachment A-2 lists the information we are requesting. To facilitate the collection of this information, we suggest that a letter be sent to the individuals in charge of each community pasture (sample letter attached) authorizing our representative to obtain the necessary information.

We understand your staff throughout the State is very busy. We want to minimize the disruption to their workflow and plan on obtaining new information through telephone and onsite meetings with agency personnel. RCI also intends to bring their own photocopy machine to lessen the impact to the district offices. We must have the report completed by January 1, 2001 so it is our intent to begin gathering this information as soon as we can.

I know you understand the importance of this project to both the State as a whole and to Nevada's counties. I would like to follow up with you in person to answer any questions you may have about this effort and finalize our cooperative efforts with the Bureau of Reclamation to gather this information. Please let me know at your earliest convenience when we can get together to discuss this further.

Sincerely,

Robert S. Hadfield
Executive Director

RSH/mg
attachments

NACO
NEVADA ASSOCIATION OF COUNTIES
308 NORTH CURRY STREET, SUITE 205 • CARSON CITY, NEVADA 89703 (775) 883-7863 FAX (775) 883-7398

April 4, 2000

Robert Vaught
Forest Supervisor
Humboldt-Toiyabe National Forest
1200 Franklin Way
Sparks, NV 89431

Dear Bob:

The 1999 Nevada Legislature appropriated funds to create a Nevada Public Land Grazing Database and Economic Analysis. While similar efforts have been done for particular areas of the State, no complete statewide database has ever been developed. In 1999, the Nevada Association of Counties published a report entitled "Reviving Nevada's Rural Economies" and in that report we encouraged research activities to address rural economic issues aimed at developing a comprehensive understanding of the role of public lands in relation to reviving Nevada's rural economies. As such, we were asked by the Nevada State Department of Agriculture to assist in fulfilling this legislative mandate.

The goal of this effort is to construct and accurately display information on public land grazing in Nevada. Once we have compiled this information, all compiled and verified records of individual grazing allotments will be subjected to an economic input and output model that has been regionally calibrated and verified by the Applied Economics and Statistics Department of the University of Nevada, Reno. The economic analysis will include a determination of the annual economic effect on the livestock industry, business sectors and governmental revenues and the economic effect on the income and property values of ranchers.

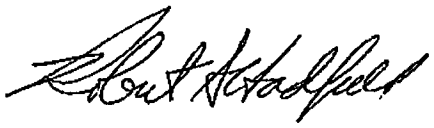
For this effort to be successful, we need your assistance. We have contracted with the consulting firm of Resource Concepts, Inc. (RCI) to help us obtain the required information to complete the database. We believe that the cooperative effort between the applicable federal agencies, the State of Nevada, the Nevada Association of Counties and Resource Concepts, Inc. will produce the highest quality report possible. Following is our suggested course of action to obtain the necessary information, however, after your review of this letter, I welcome any suggestions you have that may make this process flow more smoothly.

Much of the information on Forest Service grazing allotments has been collected and subsequently updated with previous reports that have been drafted on specific areas of the State. Attachment A-1 shows the project area as defined by federal agency jurisdiction and indicates where we need to update information and where we need to complete a new survey. We suggest that a letter be sent to each district (sample letter attached) authorizing our representative to obtain the necessary information. Attachment A-2 lists the information we are requesting along with a list of the Forest Service allotments for which we have information.

We understand your staff throughout the State is very busy. We want to minimize the disruption to their workflow and plan on obtaining new information and verifying updated data through telephone and onsite meetings with agency personnel. RCI also intends to bring their own photocopy machine to lessen the impact to the district offices. We must have the report completed by January 1, 2001 so it is our intent to begin gathering this information as soon as we can.

Bob, I know you understand the importance of this project to both the State as a whole and to Nevada's counties. I would like to follow up with you in person to answer any questions you may have about this effort and finalize our cooperative efforts with the Forest Service to gather this information. Please let me know at your earliest convenience when we can get together to discuss this further.

Sincerely,



Robert S. Hadfield
Executive Director

RSH/mg
attachments

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NEVADA ASSOCIATION OF COUNTIES
308 NORTH CURRY STREET, SUITE 205 • CARSON CITY, NEVADA 89703 (775) 883-7863 FAX (775) 883-7398

April 4, 2000

Robert Williams
State Supervisor
U.S. Fish and Wildlife Service
1340 Financial Blvd.
Reno, NV 89502

Dear Bob:

The 1999 Nevada Legislature appropriated funds to create a Nevada Public Land Grazing Database and Economic Analysis. While similar efforts have been done for particular areas of the State, no complete statewide database has ever been developed. In 1999, the Nevada Association of Counties published a report entitled "Reviving Nevada's Rural Economies" and in that report we encouraged research activities to address rural economic issues aimed at developing a comprehensive understanding of the role of public lands in relation to reviving Nevada's rural economies. As such, we were asked by the Nevada State Department of Agriculture to assist in fulfilling this legislative mandate.

The goal of this effort is to construct and accurately display information on public land grazing in Nevada. Once we have compiled this information, all compiled and verified records of individual grazing allotments will be subjected to an economic input and output model that has been regionally calibrated and verified by the Applied Economics and Statistics Department of the University of Nevada, Reno. The economic analysis will include a determination of the annual economic effect on the livestock industry, business sectors and governmental revenues and the economic effect on the income and property values of ranchers.

For this effort to be successful, we need your assistance. We have contracted with the consulting firm of Resource Concepts, Inc. (RCI) to help us obtain the required information to complete the database. We believe that the cooperative effort between the applicable federal agencies, the State of Nevada, the Nevada Association of Counties and Resource Concepts, Inc. will produce the highest quality report possible. Following is our suggested course of action to obtain the necessary information, however, after your review of this letter, I welcome any suggestions you have that may make this process flow more smoothly.

Attachment A-1 shows the project area as defined by federal agency jurisdiction and Attachment A-2 lists the information we are requesting. To facilitate the collection of this information, we suggest that a letter be sent to each wildlife refuge office (sample letter attached) authorizing our representative to obtain the necessary information.

We understand your staff throughout the State is very busy. We want to minimize the disruption to their workflow and plan on obtaining new information through telephone and onsite meetings with agency personnel. RCI also intends to bring their own photocopy machine to lessen the impact to the district offices. We must have the report completed by January 1, 2001 so it is our intent to begin gathering this information as soon as we can.

I know you understand the importance of this project to both the State as a whole and to Nevada's counties. I would like to follow up with you in person to answer any questions you may have about this effort and finalize our cooperative efforts with the U. S. Fish and Wildlife Service to gather this information. Please let me know at your earliest convenience when we can get together to discuss this further.

Sincerely,

Robert S. Hadfield
Executive Director

RSH/mg
attachments

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NEVADA ASSOCIATION OF COUNTIES
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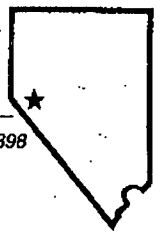


April 4, 2000

Robert Abbey
Nevada State Director
Bureau of Land Management
1340 Financial Blvd.
Reno, NV 89502

Dear Bob:

The 1999 Nevada Legislature appropriated funds to create a Nevada Public Land Grazing Database and Economic Analysis. While similar efforts have been done for particular areas of the State, no complete statewide database has ever been developed. In 1999, the Nevada Association of Counties published a report entitled "Reviving Nevada's Rural Economies" and in that report we encouraged research activities to address rural economic issues aimed at developing a comprehensive understanding of the role of public lands in relation to reviving Nevada's rural economies. As such, we were asked by the Nevada State Department of Agriculture to assist in fulfilling this legislative mandate.

The goal of this effort is to construct and accurately display information on public land grazing in Nevada. Once we have compiled this information, all compiled and verified records of individual grazing allotments will be subjected to an economic input and output model that has been regionally calibrated and verified by the Applied Economics and Statistics Department of the University of Nevada, Reno. The economic analysis will include a determination of the annual economic effect on the livestock industry, business sectors and governmental revenues and the economic effect on the income and property values of ranchers.

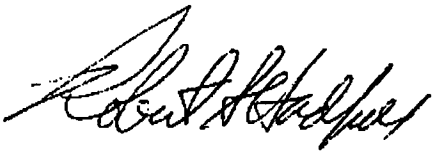
For this effort to be successful, we need your assistance. We have contracted with the consulting firm of Resource Concepts, Inc. (RCI) to help us obtain the required information to complete the database. We believe that the cooperative effort between the applicable federal agencies, the State of Nevada, the Nevada Association of Counties and Resource Concepts, Inc. will produce the highest quality report possible. Following is our suggested course of action to obtain the necessary information, however, after your review of this letter, I welcome any suggestions you have that may make this process flow more smoothly.

Much of the information on BLM grazing allotments has been collected and subsequently updated with previous reports that have been drafted on specific areas of the State. Attachment A-1 shows the project area as defined by federal agency jurisdiction and indicates where we need to update information and where we need to complete a new survey. We suggest that a letter be sent to each district (sample letter attached) authorizing our representative to obtain the necessary information. Attachment A-2 lists the information we are requesting along with a list of the BLM allotments for which we have information. Is it possible for you to also assist us in gathering information from the Susanville BLM district office for those allotments that are in Nevada? Please let me know if we can work through you for this information or if we need to work through the California state office.

We understand your staff throughout the State is very busy. We want to minimize the disruption to their workflow and plan on obtaining new information and verifying updated data through telephone and onsite meetings with range conservationists. RCI also intends to bring their own photocopy machine to lessen the impact to the district offices. We must have the report completed by January 1, 2001 so it is our intent to begin gathering this information as soon as we can.

Bob, I know you understand the importance of this project to both the State as a whole and to Nevada's counties. I would like to follow up with you in person to answer any questions you may have about this effort and finalize our cooperative efforts with the BLM to gather this information. Please let me know at your earliest convenience when we can get together to discuss this further.

Sincerely,



Robert S. Hadfield
Executive Director

RSH/mg
attachments

NACO
NEVADA ASSOCIATION OF COUNTIES
308 NORTH CURRY STREET, SUITE 205 • CARSON CITY, NEVADA 89703 (775) 883-7863 FAX (775) 883-7398

April 4, 2000

Robert Vaught
Forest Supervisor
Humboldt-Toiyabe National Forest
1200 Franklin Way
Sparks, NV 89431

Dear Bob:

The 1999 Nevada Legislature appropriated funds to create a Nevada Public Land Grazing Database and Economic Analysis. While similar efforts have been done for particular areas of the State, no complete statewide database has ever been developed. In 1999, the Nevada Association of Counties published a report entitled "Reviving Nevada's Rural Economies" and in that report we encouraged research activities to address rural economic issues aimed at developing a comprehensive understanding of the role of public lands in relation to reviving Nevada's rural economies. As such, we were asked by the Nevada State Department of Agriculture to assist in fulfilling this legislative mandate.

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For this effort to be successful, we need your assistance. We have contracted with the consulting firm of Resource Concepts, Inc. (RCI) to help us obtain the required information to complete the database. We believe that the cooperative effort between the applicable federal agencies, the State of Nevada, the Nevada Association of Counties and Resource Concepts, Inc. will produce the highest quality report possible. Following is our suggested course of action to obtain the necessary information, however, after your review of this letter, I welcome any suggestions you have that may make this process flow more smoothly.

Much of the information on Forest Service grazing allotments has been collected and subsequently updated with previous reports that have been drafted on specific areas of the State. Attachment A-1 shows the project area as defined by federal agency jurisdiction and indicates where we need to update information and where we need to complete a new survey. We suggest that a letter be sent to each district (sample letter attached) authorizing our representative to obtain the necessary information. Attachment A-2 lists the information we are requesting along with a list of the Forest Service allotments for which we have information.

We understand your staff throughout the State is very busy. We want to minimize the disruption to their workflow and plan on obtaining new information and verifying updated data through telephone and onsite meetings with agency personnel. RCI also intends to bring their own photocopy machine to lessen the impact to the district offices. We must have the report completed by January 1, 2001 so it is our intent to begin gathering this information as soon as we can.

Bob, I know you understand the importance of this project to both the State as a whole and to Nevada's counties. I would like to follow up with you in person to answer any questions you may have about this effort and finalize our cooperative efforts with the Forest Service to gather this information. Please let me know at your earliest convenience when we can get together to discuss this further.

Sincerely,

Robert S. Hadfield
Executive Director

RSH/mg
attachments

APPENDIX IV SUMMARY OF AUM DATA BY AGENCY

Table 17. Summary Data Sheet for AUM Changes

Agency	Administration Unit	1960	1980	1995	1999	His	Percent Change		
						Suspd	80-95	95-99	80-99
BLM	ELY Field Office								
	Caliente	186563	187048	180613	171806	70378	3	5	8
	Egan	223710	215627	169135	159135	39065	22	6	26
	Schell	195689	196000	177021	171339	4986	10	3	13
	SUSANVILLE Offices								
	Eagle Lake	14934	14934	14934	14934	7941	0	0	0
	Surprise	95883	96647	88957	89387	50172	8	0	8
	ELKO Field Office								
	Elko	391922	391921	376185	381231	91761	4	-1	3
	Wells	403271	387079	369137	353458	8805	5	4	9
	CARSON CITY Field Office								
	Lahontan	108696	109861	105048	104862	4183	4	0	5
	Walker	88713	83804	57258	55979	1120	32	2	33
	WINNEMUCCA Field Office								
	Paradise-Denio	225684	229323	212100	219612	83643	8	-4	4
	Sonoma-Gerlach	170084	139871	104041	103474	29684	26	1	26
	BATTLE MTN. Field Office								
	Shoshone-Eureka	392918	329513	266353	263405	5888	19	1	20
	Tonopah	198208	198228	168256	134120	22129	15	20	32
	LAS VEGAS Field Office								
	Stateline		22350	4664	5419	0	79	-16	76
BOR	Pershing County			10517	14031				-33
	Truckee-Carson		6295		2482				61
NPS	GBNP			1591	1739				
USFS	Austin		35703	28488	23041		20	19	35
	Bridgeport		10898	22353	23171		-105	-4	-113
	Carson		2747	748	748		73	0	73
	Ely		39924	32258	30456		19	6	24
	Jarbidge		35745	32924	32952		8	0	8
	Mtn City		129618	91529	87013		29	5	33
	Ruby Mtn		48557	35869	34636		26	3	29
	Santa Rosa		57847	53570	51109		7	5	12
	Tonopah		16897	16085	8521		5	47	50
	White Mtn		1895	1895	1895		0	0	0
USFWS	Pahranagat		415	1857	0		-347	100	100
	Ruby Lake		5083	2264	713		55	69	86
	Sheldon		14471	0	0		100		100
	Stillwater		12098	5887	6178		51	-5	49
Total AUMs for Nevada		2696275	3020399	2631537	2546846	419755	13	3	16

APPENDIX V ACRONYMS

Acronym List

AML: Appropriate Management Level
AMP: Allotment Management Plan
ARS: Agricultural Research Service
AU: Animal Unit
AUM: Animal Unit Month
AUY: Animal Unit Year
BLM: Bureau of Land Management
BOR: Bureau of Reclamation
EIS: Environmental Impact Statement
FLPMA: Federal Land Policy and Management Act
GABS: Grazing Authorization and Billing System
GBNP: Great Basin National Park
GIS: Geographical Information System
GLO: Government Land Office
HM: Head Month
HMA: Herd Management Area
I/O: Input-Output
IM: Instructional Memorandum
IMPLAN: Impact Analysis for Planning
LMNRA: Lake Mead national Recreation Area
LVFO: Las Vegas Field Office
NACO: Nevada Association of Counties
NEPA: National Environmental Protection Act
NFMA: National Forest Management Act
NGS: Nevada Grazing Statistics
NPS: National Park Service
NRA: National Recreation Area
NRCS: National Resources Conservation Service
NRMH: Nevada Rangeland Monitoring Handbook
NWR: National Wildlife Refuge
PCWCD: Pershing County Water Conservation District
PRIA: Public Rangelands Improvement Act
RCI: Resource Concepts, Incorporated
RLNWR: Ruby Lake National Wildlife Refuge
RMP: Resource Management Plan
RPA: Resources Planning Act
SCS: Soil Conservation Service
SHMR: Sheldon-Hart Mountain Refuge
SRM: Society for Range Management
SVIM: Soil-Vegetation Inventory Method
TCID: Truckee Carson Irrigation District
TNR: Temporary Non Renewable
UNR: University of Nevada Reno
USDA: United States Department of Agriculture
USDI: United States Department of Interior
USFS: United States Forest Service
USFWS: United States Fish and Wildlife Service
WMA: Wildlife Management Area
WO: Washington Office

APPENDIX VI BOUNDARY CHANGE IMPACTS ON DATABASE

It is imperative that an understanding of the database recording system be given so the reader, and future users of the database, will know how to interpret the information presented in the database. The difficult concept that needs explanation is how allotment boundary changes were handled in the database.

BOUNDARY CHANGE EXAMPLE

To illustrate how data input into the database records boundary changes a hypothetical Field Office will be used in the following example. The Field Office will be *Nevada Example*, with two allotments, A an B. The example starts off in 1960 at adjudication. Each box represents a map showing allotment boundaries. Allotment A has twice the acreage and AUMs as Allotment B. The difficulty encountered was how to handle boundary change influence on AUMs within the database and regarding adjudicated AUMs.

Allotment A, 1000 AUMs at adjudication	Allotment B, 500 AUMs at adjudication

In 1980 AUMs and boundaries remain the same. However, in 1995 the allotment boundary is changed. Allotment A becomes smaller and the AUMs and part of the land area are now under Allotment B.

Allotment A, 500 AUMs in 1995	Allotment B, 1000 AUMs in 1995

Herein lies the confusion. Observe the 1995 Allotment information in Table 1 below (Table 18 contains the data that is in the NGS database). For Allotment A it would appear that there had been a reduction since adjudication of 500 AUMs. At the same time it would appear there had been an increase in Allotment B of 500 AUMs since adjudication, when in reality no increase or decrease occurred for the total area occupied by Allotments A and B. It is an abstract concept that must be understood. The way to avoid confusion is to report increases and decreases at the Field Office Level, and that is how data were handled for this report.

Table 18. Nevada Example Field Office Data if Adjudicated AUMs Remain with Original Allotment when a Boundary Change Occurs

	1960	1980	1995	Apparent Change in AUMs 1980 to 1995	Apparent Changes in AUMs 1960 to 1980
Allotment A AUMs	1000	1000	500	- 500	0
Allotment B AUMs	500	500	1000	+ 500	0
Total AUMs	1500	1500	1500	0	0

Interpretation of the above example suggests a decrease in AUMs for Allotment A and an increase for Allotment B.

Conversely it is not appropriate to transfer the adjudication AUMs to Allotment B when the boundary change occurred. In Table 19 adjudication AUMs were transferred at the time of the boundary change, which would cause the table to look as follows (remember the original numbers before the boundary change, Allotment A 1000 AUMs at adjudication, Allotment B 500 AUMs):

Table 19. Nevada Example Field Office Data if Adjudicated AUMs Moved from Allotment A to Allotment B with the Boundary Change

	1960	1980	1995	Apparent Change in AUMs 1980 to 1995	Apparent Changes in AUMs 1960 to 1980
Allotment A AUMs	500	1000	500	- 500	+ 500
Allotment B AUMs	1000	500	1000	+500	-500
	1500	1500	1500	0	0

It is readily apparent why the adjudication AUMs in the database cannot remain with the AUMs shifted to Allotment B as the boundary changed. Look at Allotment A; there would now be 500 adjudicated AUMs, 1980 would have 1000 AUMs, and 1995 500 AUMs. This would erroneously show first an increase and then a decrease in AUMs for Allotment A. The same logic would be used for Allotment B interpretation. Notice though, that Total AUMs at adjudication, 1980, and 1995 remain the same. That is why Field Office wide data should be used for interpretation in this report, and when interpreting database information in the future. However, local level allotment information is accurate in the database, and can be used for analysis, but allotment level data cannot be compiled to produce an accurate summary of Field Office Level information. Therefore, if there is an interest in a specific allotment, it can be viewed in the database and the information needed to interpret the results will be contained in the note section.